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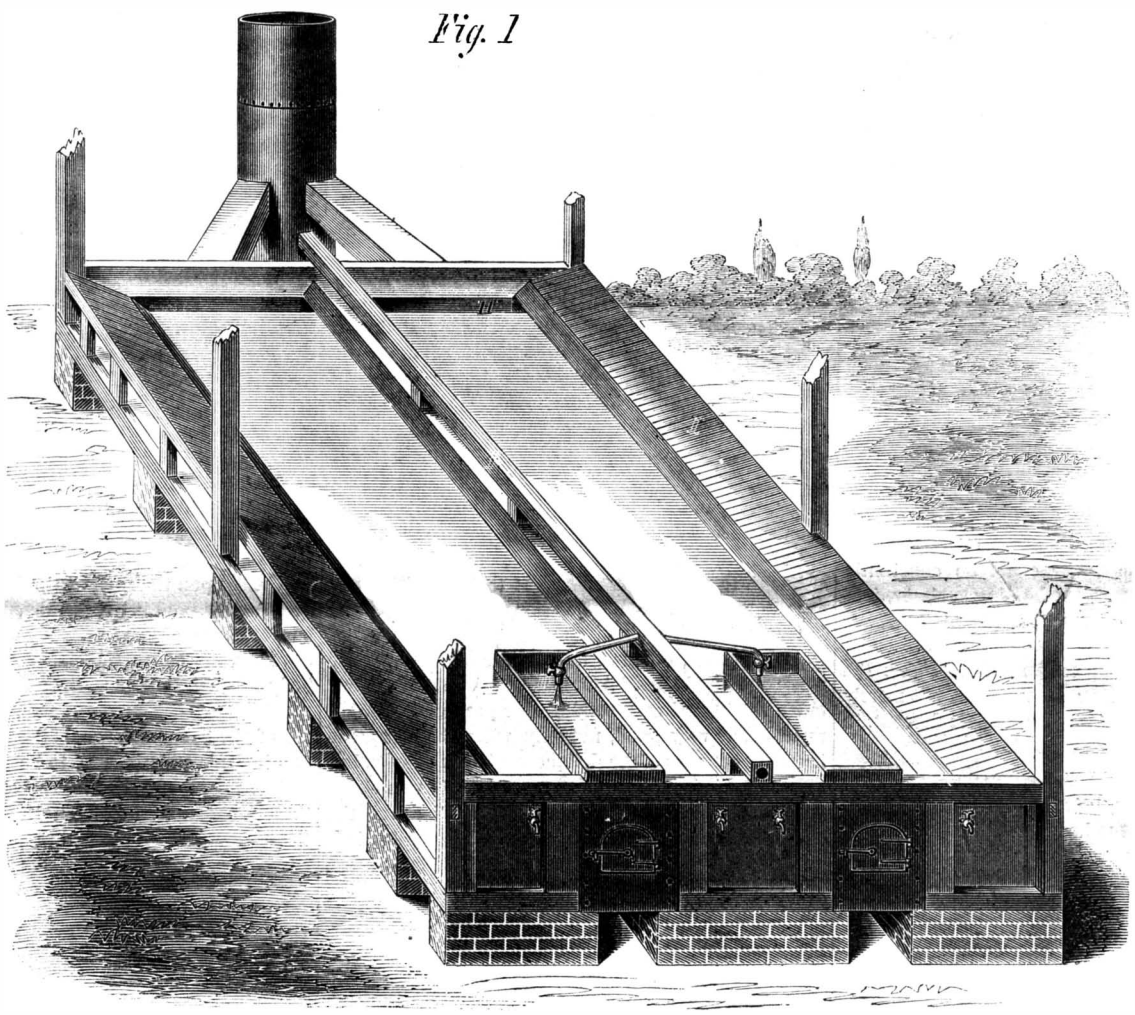
Economical Method of Manufacturing Salt.

A new and economical system for a salt factory or block, as it is technically termed, is here illustrated, the drawings and description having been furnished us for publication by Messrs. Beach & Waterman, of Saginaw city, Mich., proprietors of the block.

Fig. 1 represents a perspective view of the entire working parts, having the building and reservoir in the rear removed. Fig. 2 is a transverse section view across the center. Fig. 3 is a transverse section across the furnaces near the front. The parties referred to say:—

"We noticed in the SCIENTIFIC AMERICAN of November 15, 1862, a statement from Mr. Nathan Chapin, of East Saginaw, Mich., relating to his new patent method of salt evaporation, which was then in operation, showing a saving of about one-third of the usual expense of manufacture with a prospect of still greater gain on removing the obstructions which he then saw. His investigations upon both the manufacture and the use of salt, are still in successful progress, and are attended with developments interesting to the people at large as well as to himself. It is the superior advantages of his process that has led us to the business of salt making, and we are now running one of his improved blocks or manufactories of a moderate capacity, as an introduction to a more extended business. Our works consume three cords of dry elm and black ash wood in 24 hours. We turn out upwards of 40 barrels or 200 bushels of salt in the same time, with the help of one fireman and one raker, day and night. These men are able to perform 100 per cent more labor were the block constructed to require it. This is twice the salt from a given amount of fuel and labor that any process in this region has yet produced, and it is of the most perfect quality. It has no chance to be otherwise as he quantity of salt by this method does not depend upon the skill and diligence of workmen, but upon an accurate compliance of the process to the chemical requirements of the brine for securing that end. The density of the brine, as it comes from the well, stands at 86, in a scale indicating saturation at 100. That is 14 degrees weaker than full saturation, which is the average strength of the brine of this valley.

Fig. 1



AN ECONOMICAL METHOD FOR MANUFACTURING SALT.

"The apparatus appears to be free from the difficulties of incrustation and irritable effects of fire and salt, and is very simple in its construction; it consists, mainly, in a vat of brine about 14 feet by 84 and 26 inches deep, heated by a submerged furnace and flue running lengthwise through it to a draught chimney in the rear. This vat is fed by a continuous stream of brine falling directly upon the furnace therein, to which it is limited until it boils to nearly the point of crystallization; it then flows off and unites with the mass in the vat, where it is kept at a high degree of temperature for several days, until it reaches the rear end of the vat, when all its solid impurities become formed and settled, and the brine in a refined state finds its way upon the graining pan in the same continuous manner, to be reduced to salt. This pan is constructed of sheet metal and placed directly over the vat of heated brine It sits partly down into it so as to receive its supply without forcing, and also receives its heat therefrom, by being transmitted through its sheet-metal bottom; the granulating process is carried on in the same continuous way, assisted, however, by a "strip" of direct heat from the submerged flue. This being made flat on its upper side constitutes a narrow portion of the pan through the center of its bottom.

"The salt is raked out at intervals of six hours and lodged on a draining rack placed upon one edge of the pan projecting over the mass of heated brine in the vat below so as to receive the steam therefrom.—This hastens the drainage so much that it is fit for packing in two hours after raking. The use of lime for cleaning the brine is principally or quite unnecessary, and there seems to be no cause for stopping the operation for the season. We are using two parallel sets of this apparatus with salt bins on either side inclosed in a building. When used single it should occupy a building about 22 feet by 100 inside of the bins and fire room, with a furnace through the center. The larger the crystallizing surface may be, with proper temperature, the more it compensates for not boiling, and the more perfect the quality of salt."

Fig. 2

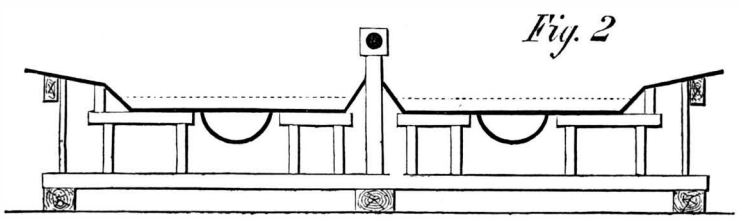
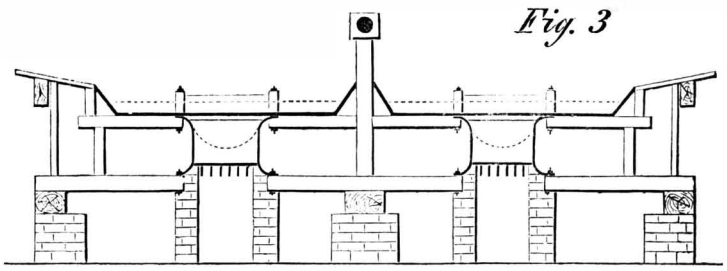


Fig. 3



This block was patented on the 18th of April, 1862, by Nathan Chapin, East Saginaw. Mich.

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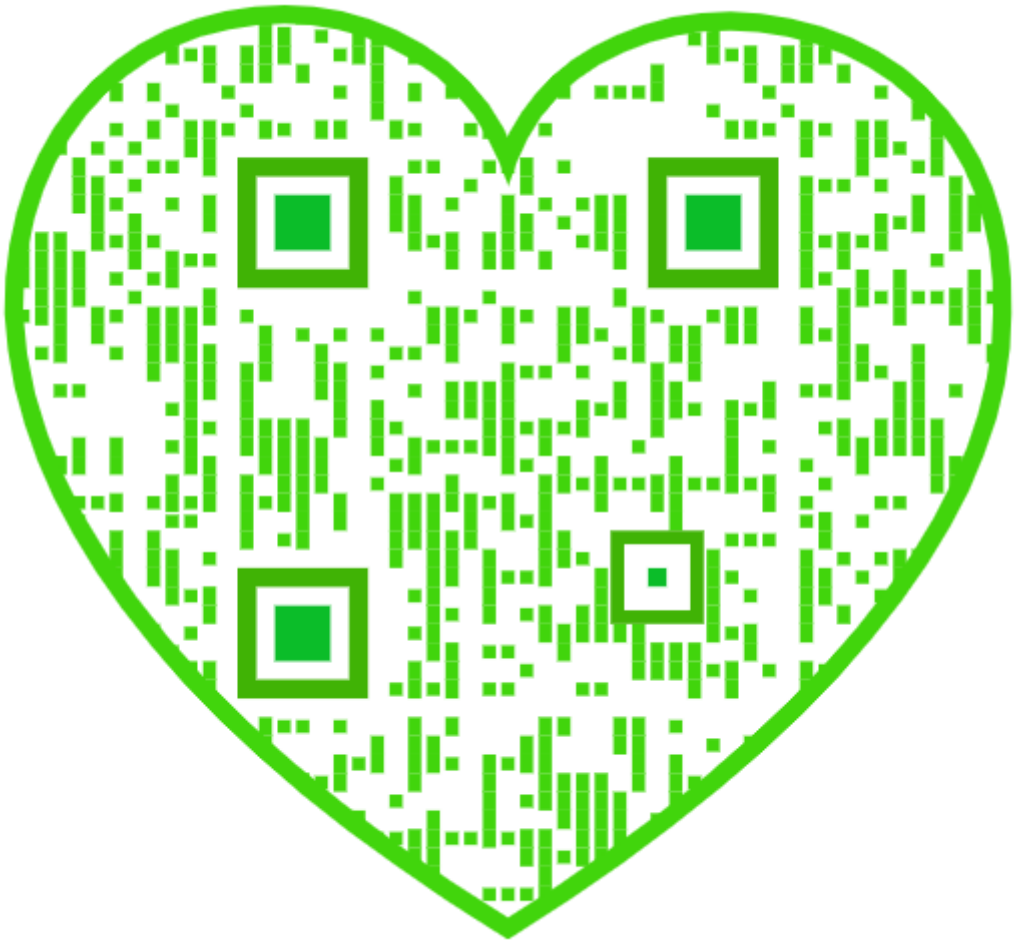

COLBURN ON STEAM BOILERS.

We published, some time since, a description of the Harrison boiler, which consists of a series of small, hollow cast-iron globes communicating with each other. The advantages of this boiler were recently set forth by Mr. Zerah Colburn, C. E., in a paper read before the British Association, as follows :—

EVAPORATION TO SURFACE.

The rate at which heat may be transmitted through an iron boiler plate, without injury to its substance, has never been precisely ascertained. About 70,000 units of heat per hour, equal to the evaporation in that time of one cubic foot of water from 60 degs., is believed to be the utmost per square foot of plate of ordinary thickness. But in order to approximately apply the *whole* heat of a furnace to the purposes of evaporation, a much larger area of heating surface, per unit of work done, is requisite. Watt fixed the proportion of one square yard of heating surface per cupic foot of water evaporated per hour, and this has been sanctioned by modern practice. But the average depth, or, in other words, the thickness of the stratum, of water thus boiled away is only $1\frac{1}{3}$ inches per hour, $\frac{1}{45}$th inch per minute, or $\frac{1}{2700}$th inch per second, over the whole heating surface. From ten to twelve seconds are thus occupied in vaporizing a *couche* of water, no thicker than a single leaf of the paper upon which books are commonly printed. If, in proportion to the evaporation, an insufficient extent of heating surface be provided, there is not only a direct waste of heat the products of combustion escaping at a temperature corresponding, perhaps, to that of incandescent iron—but the furnace plates may be burnt. Notwithstanding the active convection of heat in water, an intense flame, directed against the sides or roof of a boiler furnace, will, in time, crack or blister the iron. It is not certain that this result occurs from the inability of the metal to transmit the heat, for it is more likely that, under vigorous vaporization, the gravity of the liquid water (and it is its gravity only that brings it to the heating surfaces) is insufficient to bear down effectively against the rising volumes of steam. If, by powerful mechanical means, the water could be constantly maintained in contact with the heating surfaces, it is possible that the rate of evaporation upon a given area could be increased without injury to the plate. In the hardening of anvil faces and of steel dies, the requisite rapidity of cooling is obtained, not merely by immersion in water, but by its forcible descent, in a strong jet, upon the heated metal.

EXTERNAL HEATING SURFACE.

Under the conditions, however, of ordinary practice, no restriction of the heating surface is permissible. This surface is sometimes that of the exterior only of the boiler, but it is more usual, and on most accounts preferable, to dispose it internally by means of fire boxes, flues or tubes. The external surface of a boiler can only be increased by increasing its length or its diameter, or by increasing both of these together. Plain cylindrical boilers 90 feet, and in one or two instances 104 feet in length, have been employed, but, even apart from any consideration of the great amount of space which they occupy, they are mechanically objectionable, and they are now no longer made. In increasing the external surface of a boiler by enlarging its diameter, it is weakened exactly in proportion to the increase, the bursting pressure, for a given thickness of plates, being inversely as the diameter. The danger attending the presence of a large quantity of heated water in a boiler is now well understood, and, such as it is, it increases as the square of the diameter, so that, in a boiler of a given length, the elements of weakness and danger are collectively related to the cube of the diameter. External heating surface may be provided for in a number of smaller vessels, as in the retort boilers by Mr. Dunn, but these are of the water-tube family, which, heretofore, has been found subject to choking with the solid matter deposited by the water.

INTERNAL HEATING SURFACE.

Next are the boilers with internal heating surfaces. Internal fire tubes were in use in steam boilers in the last century, and they were applied within a cylindrical barrel by the Cornish engineers, among whom was Trevithick, who employed both the straight flue and the return flue, and who ma e the fire-place within the flue. The Cornish boiler, in this form, was improved by Mr. Fairbairn and the late Mr. Hetherington, who added another fire tube, thus making the two-flued boiler now so extensively employed in Lancashire. The two flues, although somewhat smaller than the single flue, afforded a greater extent of heating surface, besides securing increased regularity in firing. The principle of subdividing the flame and heated products of combustion, so as to obtain greatly increased heating surface within a barrel of given diameter, was fully carried out in the multitubular boiler invented by Neville, of London, in 1826, employed by Seguin, in France, in 1828, and subsequently in the Liverpool and Manchester locomotives, from which it has been handed down to the present practice of engineers. Not since Watt's time, however, has the evaporative power of a square foot of heating surface been increased, the improvement in the plan of steam boilers being that, chiefly, of inclosing a greater extent of surface within a given space. The heating surface, in the boilers of the *Great Eastern* steamship, is equal to the entire area of her vast main deck, that in the *Adriatic* measures more than three-fourths of an acre, while the *Warrior* and the *Black Prince* have, in their boilers, 2,500 square yards of surface of tubes, the aggregate length of which is more than $5\frac{1}{2}$ miles.

OBJECTIONS TO MULTITUBULAR BOILERS.

But it is only where, as in steamships and in locomotive engines, the dimensions and weight of boilers must be the least possible, that the multitubular arrangement is even to be tolerated. It is costly and subject to rapid decay. In steamships, especially, the life of multitubular boilers is comparatively short. The boilers in her Majesty's vessels of war are found to last but from five to seven years; those of the West Indian Royal mailships last, according to Mr. Pitcher, of Northfield, six years only, and those of the Dover and Calais packets, taking the testimony of the former mail contractor, Mr. Churchward, need to be renewed every three and a half or four years. On land, multitubular boilers, working under constant strain, and, in most cases, as constantly concentrating a saturated solution of sulphate of lime, are nearly out of the question for the purpose of manufactories, although there are instances of their employment, even in spinning mills. A boiler rated at 40 nominal horse-power will ordinarily evaporate 60 cubic feet of water per hour, or upwards of 100 tuns of water per week of sixty hours. And feed water containing as much as 40 grains of solid matter per gallon is often regarded as very good, not only when the inorganic impurity consists of the deliquescent salts of so a, but even when it is neither more nor less than an obdurate carbonate or sulphate of lime. Whatever the solid matter contained in the water may be, it is never carried over with the steam, but is left behind in the evaporating apparatus, and 100 tuns of the water, fed in a single week to a boiler in the manufacturing districts, commonly contains a hundred weight or more of dissolved gypsum or marble, and of which all that is not held in solution is deposited in a calcareous lining upon the internal metallic surfaces. This fact will explain why not only water-tube, but multifire tube boilers cannot be economically employed under the ordinary circumstances of steam generation. The consideration of deposit or scaling, as well as that of workmanship, imposes a limit to the subdivision of heating surface among a great number of small tubes.

OBJECTIONS TO WROUGHT-IRON SPHERES.

In ordinary boiler making the geometrical advantage of the sphere cannot be turned to account. It cannot be produced economically in plate iron, nor, if made in plate iron, could it be advantageously applied in a steam boiler. The hollow sphere has this property, to wit: with a given thickness of metal it has twice the strength of a hollow cylinder of the same diameter. This is upon the assumption (which is correct where the cylinder is of a length greater than its own diameter), that the ends of the cylinder offer no resistance to a bursting pressure exerted against the circumference. Under over-pressure, a closed cylinder would take the shape of a barrel, and if of homogeneous material and structure, it would burst at the middle of its length, and in the direction of the circumference. The circumference of a sphere of a diameter of 1 being always 3.14159, the sum of the length of the two sides of a cylinder of the same diameter, and having a plane of rupture of the same area, is 1·5708, or exactly half as much. And not only are the boiler-heads of no service in resisting the strain in the direction of the circumference of the cylinder, and not only are they weak in themselves, except when of a hemispherical form, or when well stayed, but, furthermore, the whole pressure against them is exerted to produce a strain of the sides of the cylinder in the direction of its length, and where there is no through stay-rod between the opposite heads this strain is necessarily equal to one-half of that exerted in the direction of the circumference.

WEAKNESS OF ORDINARY BOILERS.

The bursting pressure of steam boilers is commonly calculated from the average tensile strength of wrought-iron plates. This strength is very variable however, and it would be more logical to take the minimum. The most extensive series of experiments upon the strength of iron plates is that made by Mr. Kirkaldy for Messrs. Napier, of Glasgow. The number of samples of each description of iron tested was not large, yet the tensile strength ranged between very wide limits. That of Yorkshire iron varied between 62,544 lbs. per square inch and 40,541 lbs., both specimens being from the same makers. Staffordshire plates varied between 60,985 lbs., and 35,007 lbs., and Lanarkshire plates between 57,659 lbs. and 32,450 lbs. The conclusion cannot be resisted that engineers are frequently dealing with boiler plates of a tensile strength not greater than from 16 to 18 tuns per square inch, notwithstanding that the average strength may be 22 tuns, and the maximum 27 tuns. And the loss of this strength in punching the rivet holes is not merely that of the iron cut out, but the punch is found to sensibly injure that which remains. Mr. Fairbairn's well-known and frequently verified ratio of 56 to 100, as the strength of a single riveted joint to that of the unpunched plate, must be always admitted in calculations of the strength of riveted boilers. The 40-horse Lancashire boiler, 7 feet in diameter, will thus be often found to have an ultimate strength not greater, when new, than that corresponding to a pressure of from 210 lbs. to 235 lbs. per square inch. This, however, is without taking account of the strain exerted longitudinally upon the shell of the boiler by the pressure on the ends, and it is upon the assumption, which is hardly tenable, that the boiler heads, and especially the flues, are of the same strength as the cylindrical body or shell. Without the angle-iron strengthening recommended by Mr. Fairbairn, the collapsing pressure of the flues of large boilers was found, in that gentleman's experiments, to be sometimes as little as 87 lbs. per square inch. The strain resulting from the circumferential and longitudinal components, in the outer shell, is one-eighth greater than that calculable for the circumference alone, so that, even if the heads and flues were stayed to the strength of the shell, this would correspond to a pressure of but from 190 lbs. to 210 lbs., instead of 210 lbs. to 235 lbs , as just supposed. But these estimates are for the strength of the boiler when new.

CORROSION TEE GREAT DESTROYER,

In the experience of the officers of the Manchester Boiler Association, with from 1,300 to 1,600 boilers always under their care, one boiler out of every seven, and, in some years, as in 1862, nearly one of every four, became defective by corrosion alone, while of every eight boilers examined in the course of a year seven are found to be defective in some respects Thus, in 1862, with 1,376 boilers under inspection, 85 positively dangerous, and 987 objectionable defects, were discovered, 37 dangerous and 270 objectionable cases of corrosion alone having been reported. As a boiler malady, corrosion corresponds in its comparative frequency and fatality to the great destroyer of human life—consumption. It is the one great disease. It is frequently internal, in consequence of the presence of acid in the water; but it is still often er external, and it is most insidious and certain wherever there is the least leakage of steam into the brick-work setting. Condensed steam, or distilled water is an active solvent of iron, as well as of lead, and peaty water, which, so far as *inorganic* matter is concerned, is very pure, and distilled water from surface condensers, and, indeed, any water that is quite soft, is known to eat rapidly into the substance of the boiler in which it is used. A trickling, however slight, of condensed steam, down the outside of a boiler, will fallibly cause corrosion, and to this was

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directly traced a large number of the forty-seven boiler explosions which occurred in the United Kingdom in 1863, and which were attended with the loss of seventy-six lives besides injuries more or less serious to eighty persons.

CAST-IRON NOT CORRODED.

Corrosion is most rapid where the iron is comparatively pure, as in the best Yorkshire and Staffordshire plates. The presence, however, of a small proportion of carbon, as in steel, or especially of silica and carbon, as in cast-iron, renders it nearly indestructible. The experience even with kitchen utensils demonstrates this, but it is more satisfactory to observe the fact in engineering operations on the great scale. When Nelson first introduced the hot-blast he employed wrought-iron heating stoves, and although only 300 degs. Fah. was at first fixed upon for the temperature of the blast, the stoves were rapidly destroyed. It need hardly be mentioned that a wrought-iron gas retort would be worthless, where cast-iron answers well, being inferior only to fire-clay. It is the same with forge tuyeres, cast-iron lasting indefinitely. Since super-heated steam began to be generally employed, much difficulty has been experienced from the rapid corrosion of the super-heaters. The Peninsular and Oriental Company's engineers have been compelled to adopt copper, instead of plate iron, heating surfaces for this purpose. Messrs. Richardson & Sons, of Hartlepool, have, on the other hand, adopted cast-iron, and their superheaters of this material show no corrosion whatever, after four years' use. The sulphurous fumes from locomotive engines rapidly corrode the plate iron station roofs, while the cast-iron girders and cornices remain unaffected. Cast-iron bridges are indestructible by rusting, while large quantities of iron scales are being removed from wrought-iron bridges, including the Conway and Britannia tubes. From abundant experience with cast-iron steam boilers and the tubes of cast-iron heating apparatus, it may be taken as settled that, where the thickness is moderate, cast iron may be thus employed without the possibility of corrosion.

STRENGTH OF CAST IRON.

The tensile strength of cast-iron varies between 5 tuns and 15 tuns per square inch. Considered as a material for boilers only, the minimum strength should be regarded, exactly as from 16 tuns to 18 tuns has been taken for wrought-iron plates. Cast-iron boilers 8 feet in diameter and of great length, were at one time made, but these were manifestly objectionable. The spherical form, of moderate diameter, is preferable, and whatever is the bursting strength of a riveted wrought-iron cylinder, that of a cast-iron sphere of the same diameter and the same thickness of metal will be the same. The plate iron, of a strength of 18 tuns per square inch, is virtually weakened to 10 tuns by the loss in riveting, and, as the hollow sphere is twice stronger than the hollow cylinder of the same diameter and thickness, the cast iron, having no joints, becomes equal, in this comparison to the wrought plate. If we could always count upon the maximum strength of iron, to wit, 27 tuns per square inch for wrought, and 15 tuns for cast, a 14 feet cast-iron sphere would have the same strength to resist bursting as the 7 feet cylinder of the Lancashire 40-horse boiler, supposing the same thickness of metal in each case.

NO SCALE IN HARRISON BOILERS.

But there is no occasion to make a boiler as a single large sphere, for it is now ascertained from extensive experience that hollow cast iron spheres of small diameter do not retain the solid matter deposited by the water. Small water tubes, and indeed all small water spaces in ordinary boilers, always choke with deposit when the feed-water contains lime, but cast-iron boiler spheres, although they may be temporarily coated internally with scale, are found to part with this whenever they are emptied of water. This fact is the most striking discovery that has been made in boiler engineering. It removes the fatal defect of small subdivided water spaces, which can now be employed with the certainty of their remaining constantly clear of deposit. This discovery has been made in the use of the cast-iron boiler invented by Mr. Harrison, of Philadelphia, U. S., and which is now working in several of the Midland and Northern counties. Mr. Harrison employs any required number of cast-iron hollow spheres, 8 inches in external diameter, and three-eighths of an inch thick, these communicating with each other through open necks, and being held together by internal tie bolts. A number of these spheres are arranged in the form of a rectangular slab, and several of these slabs, set side by side, and connected together, form the boiler, about two-thirds of the whole number of spheres being filled with water, while the remainder serve as steam room. The bursting strength of these spheres corresponds to a pressure of upwards of 1,500 lbs. per square inch, as verified by repeated experiment, being, therefore, from six to seven times greater than that of the ordinary Lancashire boilers of large size. The evaporative power, as in all other boilers, depends upon the extent and ratio of the grate area and heating surface, but in practice from 7½ to 8 lbs., of water are evaporated per pound of coal in a cast-iron boiler, which, for each tun of its own weight, supplies steam equal to ten indicated horse-power. The joints between the spheres are made by special machinery, securing the utmost accuracy of fitting, and there is no leakage, either of water or steam, The spheres occupied as steam space are screened by fire bricks from the direct action of the heat, but enough is allowed to reach them to secure complete drying and, if desired, any degree of superheating of the steam. The slabs into which each series of sphere is assembled, are placed in an inclined position, which secures the thorough calculation of the water. The whole quantity of water carried in a 40-horse boiler is three tuns, the boiler weighing 13 tuns, and presenting 1,000 square feet of water-heating and 500 square feet of steam-drying surface. In Manchester, with the feed-water taken from the Irwell, or from the canal, a hard scale is soon formed in the ordinary boilers; but in the cast-iron boiler a succession of thin scales of extreme hardness are found to form upon and to become detached of themselves from the inner surfaces of the water spheres. These scales are blown out with the water at the end of the week, and only small quantities can be discovered when purposely sought for. A specimen of these, slightly cohered together into a friable mass, is exhibited. A pint of loose scales and dirt is the most that has yet been found in a careful internal examination after nine months' daily work. None of the iron is removed with the scale, the weight of the spheres, after three years' service, being the same as when new. In America Mr. Harrison's cast-iron boiler has been worked for six years. Messrs. Denton, chemists, of Bow-common, London, have had one in use for three years; and for the last two years the same description of boilers have been employed at Messrs. Hetherington's, and other large works in Manchester. It should be added that the system of casting the spheres is such that their thickness is necessarily the same at all points.

The self-scaling action, which has been found to be the same in all cases where the boiler has been worked, can only be explained by conjectures, which it is not, perhaps, necessary to introduce into the present paper. It deserves the careful investigation of the chemist and mechanical philosopher, with whom the author prefers to leave the subject.

The Battle for Life between the New and Old Worlds.

The *Scientific Record*, a popular scientific journal recently started in England, cites a large number of facts to prove that the animals and vegetables of the new world are being supplanted by those of the old. It says:—

"It would appear that, as in the case of the human inhabitants, there is a law that the new comers should eventually take the place of the native denizens of the soil. W. T. Locke Travers, Esq., F.L.S., an active New Zealand botanist, thus writes from Canterbury: 'You would be surprised at the rapid spread of European and other foreign plants in this country. All along the sides of the main line of road through the plains a *Poligonum aviculare* called 'Cow Grass,' grows most luxuriantly, the roots sometimes two feet in depth, and the plants sometimes spreading over an area from four to five feet in diameter. The dock *Rumex obtusifolius* or *R. crispus*, is to be found in every river bed extending into the valleys of the mountain rivers, until these become mere torrents. The water-cress increases in our rivers to such an extent as to threaten to choke them altogether. In some of the mountain districts, where the soil is loose, the white clover, *Trifolium repens*, is completely displacing the native grasses, forming a close sward. In fact the young vegetation appears to shrink from competition with these more vigorous intruders. Dr. Hooker says that he has in vain urged on his colonial correspondents the importance of systematically recording and collecting facts on this important subject. Every problem of the geographical diffusion of plants is directly interfered with by these intruders. Mr. Darwin is the only author who has had the boldness to approach the subject. 'This great naturalist,' says Dr. Hooker, 'believes that the facts hitherto observed favor the supposition that, in the struggle for life between the denizens of the Old continents and the New, the former ones are prepotent; and he attributes this to the longer period during which they have been engaged in strife and the consequent vigor acquired. European weeds have established themselves abundantly in North America, Australia, and New Zealand, but comparatively few plants of these countries have become naturalized, and ultimately complete weeds in England. We may hence infer why it is that the indigenous plants of St. Helena and Madeira show no tendency to increase, whilst European and African trees, shrubs, and herbs are rapidly covering these islands.' The rapid propagation of European animals is no less remarkable than that of plants. J. Hart, Esq., Government geologist, Canterbury, writes as follows to Mr. Darwin: 'The native (Maori) saying is, 'as the white man's rat has driven away the native rat, so the European fly drives away our own; and as the clover kills our fern, so will the Maories disappear before the white man himself.' It is wonderful to observe the botanical and zoological changes which have taken place since Captain Cook first set foot in New Zealand. Some pigs which he and other navigators left with the natives, have increased and run wild in such a way that it is impossible to destroy them. There are large tracts of country where they reign supreme. The soil looks as if ploughed by their burrowing. Some station holders of 100,000 acres have had to make contracts for killing them at 6d. per tail, and as many as 22,000 on a single run have been killed by adventurous parties without any diminution of their number being discernible. Not only are they obnoxious by occupying the ground which the sheep farmer needs for his flock, but they assiduously follow the ewes when lambing, and devour the poor lambs as soon as they make their appearance. Another interesting fact is the appearance of the Norwegian rat. It has thoroughly extirpated the native rat, and is to be found everywhere growing to a very large size. The European mouse follows closely, and what is more surprising, where it makes its appearance, it drives to a great degree, the Norwegian rat away. Amongst other quadrupeds, cattle, dogs, and cats are found in a wild state, but not abundantly. The European house-fly is another importation. When it arrives it repels the blue bottle of New Zealand, which seems to shun its company. But the spread of the European insect goes on slowly, so that settlers, knowing its utility, have carried it in boxes and bottles to their new island stations.' 'It must be long,' says Dr. Hooker, 'before facts enough to theorize upon can be collected. Meanwhile, the inquiry appears to be, perhaps, the most interesting and important in all biology, and as such, it is most earnestly desired that all who are favorably circumstanced to pursue it, will do so both systematically and carefully.'"

"Put some Ice in it."

The highly-polished surface of ornamental silver vessels is well known to occasion considerable trouble to the photographer, not only from the brilliant mass of light reflected, but from the number of irregular reflections from surrounding objects, the effect of which materially interferes with due rendering of the design. Some very unsatisfactory results of this kind being obtained by a photographer for a large firm at the West End, the manager of the artistic department, an Irish gentlemen of great resource, exclaimed to the photographer, "Why don't you put a piece of ice in the jug?" The question was solved in a moment. A piece of ice in the silver vessel would rapidly cool it, and cause it to condense vapors on

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its surface from the surrounding atmosphere. This would just sufficiently dim the excessive luster to render a good photographic representation possible. —*Photographic News.*

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute on Thursday evening Oct. 6, 1864, the President, D. S. Tillman, Esq., in the chair.

NEW SMELTING FURNACE.

Prof. Fleury gave a description of a furnace invented some time since in Russia, and now patented all over the civilized world. It is quadilateral in form, flaring towards the top. Its principal peculiarity is the arrangement of the tuyeres, which enter on the long sides of the hearth, those on one side being opposite the middle of the spaces between those on the other side. The speaker read a long paper giving many statistics to show that these furnaces were cheaper to construct, and produced more iron in a given time and with less fuel than the circular bosh furnaces at present in use. He also stated that these furnaces are better adapted than any others to the smelting of copper and lead ores. They are called the Rachette furnace.

MAKING GLOVES.

The regular subject of the evening, glove making, was then taken up, when the President read a paper containing in the main the same facts that appeared in our last week's issue.

Dr. Richards:—Glove making was first established on any considerable scale in this country at Johnstown, in this State. When the country was new this was the frontier part of Sir William Johnson, and the Indians brought their deer skins to it for sale. The manufacture of gloves was started to utilize the skins. The gloves were cut out and distributed among the farmers of the vicinity to be sewed by the women. The business was afterwards established at Gloversville, where it was carried on in the same way. Thus for two or three generations the women of that region have been trained to glove sewing, and they have acquired a skill and proficiency that defies competition. Attempts have been made to start glove manufactories in other places, but they have failed from want of skill among the women in the vicinity of those places in this special art.

At first all of the skins were bought of the Indians, but now they are purchased in this city. Some imported cow skins are used, as well as the deer skins of this country.

Dr. Rich:—Some years ago I had a special interest in making inquiries in France into the details of the glove manufacture, and I found that the making of fine kid gloves pays very low wages even for the cheap labor of that country. I do not believe that the manufacture can be introduced into this country unless machinery can be employed.

Prof. Fleury:—I wonder that asbestos gloves are not used by firemen in this country. In Austria I have seen a man with a complete suit of asbestos walk right through a flame. His eyes were protected by plates of mica, and he carried a moist sponge over his mouth. He was also provided with bags of asbestos for carrying off valuable articles from burning buildings. I suppose a full suit might be obtained at the present time for seventy dollars.

Mr. Nieman:—Kid skins, to be suitable for gloves must be taken from the young animals before they are weaned. After they begin to live on grass the skin undergoes a change, which impairs its value for this purpose. A glove maker, or an experienced dealer, will detect the skin from a grass-fed animal as soon as he sees it.

Mr. Ely:—I have seen it stated on apparently good authority that the very finest gloves are made from the skins of kids that are obtained by killing the dam and taking the kid from her womb. I have also seen a statement of the sum which is annually paid to the French Government for the privilege of entering the sewers of Paris for the purpose of killing rats; the object being to obtain their skins to be used in glove making.

Dr. Rich:—I do not think a rat's skin is large enough to yield pieces of suitable size for gloves that are of uniform thickness and quality.

Mr. Nieman:—We sent some rat skins to Paris, but they would not sell. Even if the skins were large enough, they are spoiled by the rats biting one another so much. If you take up a dressed rat skin you will find it full of either holes or scars.

The skins of tame animals are generally better than those of wild animals, and the skins are tough in proportion to the agility of the animals.

Dr. Rowell:—The very toughest skin that saddle makers can find is a hog's skin. I do not know that the hog excels in agility.

Dr. Richards:—I was at one time interested in the manufacture of leather, and we found that calves of the most improved breeds furnished better hides than ordinary cattle.

The new mode of travel by the pneumatic tube was selected as the subject for the next meeting, and the Association adjourned.

WARREN'S DEEP-WELL OIL PUMP.

Ordinary oil wells range from 400 to 1,000 feet in depth, and when in working order the pumps therein are subjected to an immense strain from the hydrostatic pressure due to the long column of oil that has to be lifted at each stroke. This pressure is very great, and not only causes the packing to wear leaky in a short time, but it also endangers the safety of the pump barrel itself, which not unfrequently bursts from the severe strain of resisting the movement of the column. The great hydrostatic pressure referred to causes the pump piston to become so leaky in a short time that no vacuum can be maintained, and the apparatus is wholly deranged in consequence. Many rich wells have been declared dry from the failure of the pumps to act. Where such important interests are concerned, proprietors of, or others interested in oil wells, should not fail to adopt this pump, as it is devised on sound mechanical principles, and will work well if properly made. The details are as follows:—

Fig. 1.

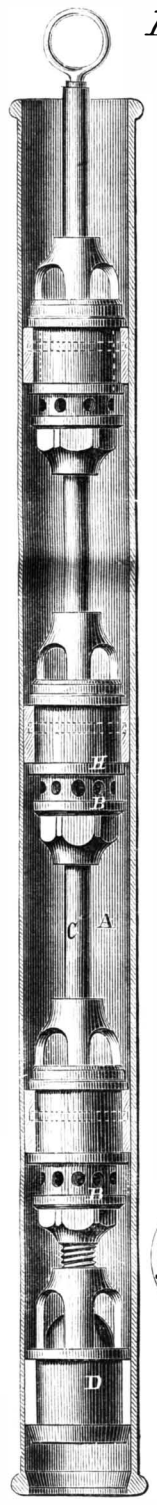

Fig. 2.

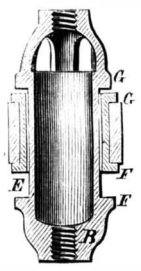

Fig. 3.

The engraving represents a long pump barrel, A, which has the pistons, B, in it. These pistons are all connected by one rod, C, and move simultaneously. At the bottom of the pump is a foot valve, D, of the ordinary kind, which opens upward, allowing oil to enter but not to return.

The pistons have a loose sleeve, E, where the packing is in ordinary pumps, (see Fig. 2) which moves up with the piston when the two flanges, F F, come together. It also moves down when the other flanges, G, come in contact. The sleeve therefore slides easily on the body of the piston. These three sliding partitions, so they may be called, virtually divide the pump barrel into as many compartments, for although the pistons move simultaneously the loose sleeves are of different lengths, so that each one moves a little in advance of the other. In this way each piston lifts only the column directly above it. So soon as the top piston moves up the flange, F, on it, strikes the loose sleeve and raises it; the oil which entered through the holes, H, is shut off from the column below, and the piston goes away from it. The second piston then meets the other loose sleeve and shuts off the oil from the openings, H, and raises its load, and so the operation goes on down the barrel. The times of lifting the load on each individual piston is regulated by the distance the loose sleeves travel on the pistons which shut off communication between one compartment and the other, earlier or later, as occasion requires. Although the aggregate load on the pump rod and bottom piston is the same as in any ordinary pump the *pressure* on the latter is far less, being only that due to the column resting upon it, as any intelligent person can see at a glance.

These pumps give great satisfaction, and can be obtained of Messrs. Hart, Ball & Hart, Buffalo, N. Y.

The invention was patented on May 10, 1864, by John Warren, of Buffalo, N. Y., from whom all further information can be obtained.

CHANGING IRON TO STEEL BY CARBONIC OXIDE

Le Genie Industriel publishes the following note recently presented to the Academy of Sciences, Paris, by M. Fred Marguerite:—

"The idea of carburation by a gas is due to Clonet, who thought that iron has such an affinity for carbon that at a very high temperature it would remove it even from oxygen. He relied for this opinion on the fact that having heated iron divided into small pieces with a mixture of carbonate of lime and clay, he obtained steel. He concluded that the carbonic acid of the carbonate of lime was decomposed, yielding its carbon to the iron.

"But Mushet, repeating the experiment of Clonet, operated with lime deprived of carbonic acid, or simply with sand, and obtained steel; thus demonstrating that the carbon was not furnished by the carbonic acid of the mixture, but by the gas from the furnace which penetrated through the walls of the crucible.

"Collet-Descotils and Marckensie proved that, in the same circumstances, the iron might be perfectly melted without its properties being sensibly altered.

"M. Boussingault, following rigorously the indications of Clonet, obtained a product which analysis demonstrated not to be steel, but the silicide of iron.

"Later, M. Leplay gave his ingenius theory of the treatment of minerals in high-furnaces, which he summed up thus:—

"Carbonic oxide reduces all the compounds, and carburets all the metals which can be reduced and carburetted by cementation.

"But in the researches followed in common by MM. Laurent and Leplay, the action of carbonic oxide was found absolutely null, and their experiments had for conclusion that carburetted hydrogen is the cause of the cementation and the carbonic oxide of the deoxydation.'

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"Thus it appears that this has not to the present time received solution. The aim of this note is to present the evidence of the direct carburetting action of carbonic oxide on iron.

"Here is the way the experiments were made:—

"Care was taken in the first place to protect the iron which was to be converted into steel from all extraneous action, by placing it in a porcelaine tube varnished on the exterior and interior. These tubes are absolutely impenetrable to the gases of the furnace.

"The carbonic oxide employed was obtained by decomposing pure oxalic acid by means of sulphuric acid equally pure. This gas was separated from the carbonic acid which accompanied it by traversing several flagons filled with a solution of potassa, and was afterwards tested by passing it through a solution of baryta which did not become turbid.

"The carbonic oxide, retaining no further trace of carbonic acid, was passed through tubes containing potassa, and then through others containing pumice stone saturated with sulphuric acid, from which it came out absolutely pure and dry to enter the porcelain tube heated to a lively red. The iron submitted to the current of the gas was a fine wire which had been carefully brightened (*decape*). At the end of two hours of calcination, the cementation was complete, and during all the time of the experiment carbonic acid was disengaged; showing that the iron had decomposed the carbonic oxide. In acquiring all the properties of steel it had fixed carbon, augmenting its weight, and had eliminated oxygen which had produced the carbonic acid.

"Notwithstanding, M. Caron has made an observation very important on the decomposition of the carbonic oxide by the silicium contained in the iron. He demonstrated that silicide of iron, over which was passed a current of carbonic oxide at the temperature of fusion of cast-iron, decomposes that gas, producing silica, which floats on the surface, and carbon, which combines with the iron, so that the cementation would be proportioned to the silicium which the iron contained, and would be null if the iron were pure.

"I have made with care an analysis of the silicium contained in the iron on which I have operated. I obtained from 10·29 grammes of iron only $0^g,009$ of silica, of which the silicium, in decomposing the carbonic oxide, would have been able to deposite only $0^g,00356$, and of carbon $0^g,00035$, while the deposite of carbon amounts to $0^g,0048$, considering only the augmentation of weight. This steel also has been analyzed:—3·010 grammes were heated during four hours in a current of moist hydrogen. It lost $0^g,014$, and after a new treatment of four and a half hours $0^g,0015$, making for eight and a half hours a total loss of $0^g,016$, which represents $0^g,0053$ of carbon, in the place of $0^g,0048$ indicated by the augmentation of the weight.

"It follows from these numbers that the influence of the silicium on the cementation by carbonic oxide, though very real, has performed in the specimen treated a part nearly insignificant.

"It is necessary then to admit a direct action between the carbonic oxide and the iron.

"Furthermore, to dissipate all doubts on this point, I have operated on some pure iron prepared in accordance with the directions of M. Peligot by heating oxalate of iron in a current of hydrogen. There was calcined for about three hours in presence of carbonic oxide 1·318 grammes of this iron which increased in weight from $0^g,00265$ grammes to $0^g,0035$, and carbonic acid was constantly disengaged. Admitting—which was not the case—that this iron contained silicium or foreign metals, the two simultaneous facts of the carburation and the production of carbonic acid would be impossible, since these metals would fix oxygen in place of eliminating it, and it would be necessary to explain the considerable deposit of carbon ($0^g,00265$) to suppose them in such quantities that their presence could not fail to be detected in the analysis.

"From these results, the cementatioon of iron by carbonic oxide cannot be doubtful, and the conditions in which it has been made have permitted the author to ascertain if nitrogen is indispensible to the production of steel. I caused a current of hydrogen to pass for a very long time over iron reduced to excessively fine sheets and properly heated to remove from it any nitrogen that it might contain, as indicated by M. Fremy.

"This iron after this long treatment was heated during three hours in an atmosphere of carbonic oxide: carbonic acid was disengaged and the iron was converted into steel. As the operation was made under shelter from the external atmosphere, and the carbonic oxide employed contained no nitrogen, I believe it safe to conclude from this cementation, as well as from that by the diamond which I have heretofore communicated, that nitrogen is not indispensable either to the production or the constitution of steel."

Poisoning by Calabar Beans in Liverpool.

From forty to fifty children were poisoned by calabar beans in Liverpool on the 11th of August. The circumstances of this remarkable case are fully detailed in the following report of the inquest held upon the body of Michael Russell, the only child who died from the effects of the poison. The inquest was held by Mr. P. F. Currey, the borough coroner, on the 19th ult. Jane Russell, the first witness, said the deceased was her son, and at the time of his death, was $6\frac{1}{2}$ years old. On the day in question he went out to play, and shortly afterwards returned crying, and fell on the floor. She asked if any one had hurt him, and he said he had eaten some nuts that he had found on some waste ground near the school in Greenland street. She took him to the Southern Hospital, where he died twenty-five minutes afterwards. Thomas Costain, overlooker for the company of African merchants, whose place of business is in Walmer buildings, Water street, and who were the owners of the barque *Commodore*, now lying in the Queen's Basin, said the barque was discharged eight or nine days ago, of a cargo of palm oil, calabar beans, and ebony. Had seen some of the beans scattered about, and had told the porters and lumpers to pick them up, as they were valuable. Inspector Moore, of the Fire Brigade, said he was in Jordan street on Thursday last week, when he saw several children, several women carrying children, some of whom were vomiting, going towards the Southern Hospital. He followed and made inquiries, and then went to a piece of waste land, between Greenland street and New Bird street, where Police-constable 802 and several other people were searching a quantity of rubbish for the beans, which he produced. Sent for a spade and broom and riddles, and had the rubbish cleared of the beans. He also took beans from several children. Then he had all the rubbish removed in a cart to the night-soil yard, Vauxhall-road. Police-constable 802 afterwards brought a carter named Samuel Price to Jordan street Bridewell, and the carter stated that he had been employed by the overlooker of the *Commodore* to remove the rubbish from the vessel. He was to have two shillings for doing so. He took the rubbish to the waste land in Greenland street. He had been told to take it to the North End. but could not afford to do so for so small a price. Mr. James Irvine, general merchant, No. 31, The Temple, Dale street, said the beans produced were calabar or esery beans, the botanical name of which was *Physostigma Venenosum*. They were highly poisonous, but scarce. They had as yet been found only in the Calabar river, and had been brought here lately as part cargo. In Calabar they were used only for poisoning, but in this country they were employed to make an eye lotion. Sometimes half a bean would poison a man, but twenty would not, because they would cause vomiting.

Cotton Supply of France.

Accounts from the cotton-manufacturing districts of France state that the cotton crisis which has created so much distress among the operatives there is fortunately almost at an end. The consumption of raw cotton in France during the first three months of the present year amounted to 20,138,537 kilogrammes, being a third more than during the corresponding period of last year, and only one-third less than during the first three months of the year 1860. Previous to the year 1861 American cotton formed more than 60 per cent of what was used by French manufacturers; at present it does not form 2 per cent of the total amount of that received from other quarters. The attempt made to cultivate cotton in Algeria, Guyana, and the West Indies, together with the encouragement given to it by the Government, leads the manufacturers to hope that in a few years there will be sufficient cotton grown in the French colonies to supply all their requirements.

FARMERS' CLUB.

The Farmers' Club of the American Institute held its regular weekly meeting at its Room at the Cooper Institute, on Tuesday afternoon, Oct. 11, the President, N. C. Ely, in the chair. We make the following selections from the proceedings:—

MULCHING IN DRY WEATHER.

Mr. Robinson read a communication from Alton, Ill., stating that the drought this year in that vicinity was so severe that the potato crop was a complete failure except on the farm of William Tucker. He planted his potatoes by laying them on the top of the ground and covering them to a depth of 16 inches with straw, and obtained a good crop.

IVY AND DOGWOOD POISON.

James B. Alcott, of East Greenwich, R. I., wrote a letter on several subjects, and stating among other things, that if persons coming in contact with poison ivy or dogwood, will wash their hands and faces soon afterwards thoroughly in cold water, they will experience no ill effects from the exposure. The sooner the washing is done the better, but it is sometimes effectual if delayed half a day.

Mr. Quinn:—We have found washing in hot water soon after exposure a perfect preventive of the action of the poison.

The President:—It is not understood by all that there are two kinds of ivy, one poisonous and the other harmless. The poisonous variety has three leaves only; the 5-leaved ivy, or Virginia Creeper, may be handled by any one with perfect impunity.

Mr. Robinson :—After the poison has taken effect I think the best remedy is tea of sweet fern taken internally and also applied as a wash.

MULCHING A REMEDY FOR CURCULIO.

Dr. Ward;—I have found that my pears, where the ground was thoroughly mulched with salt hay are almost entirely free from stings of curculio,, and I would suggest that this remedy should receive a trial from our fruit growers.

Mr. Robinson:—I suspect that the effect is to be attributed to the salt in the hay.

Dr. Ward :—That may be. But I think any one who will try the experiment will find good effects from the mulching enough to pay for the trouble and expense, eveh if it should not prevent the depredations of the curculio. If you cover hard-trodden ground with straw three or four inches deep and let it lie through the summer, it is surprising how light the soil will become. Then it keeps the ground moist and prevents the growth of weeds. I am satisfied that we do not fully appreciate the beneficial effects of mulching, especially under trees. Efficient mulching requires two or three tuns of straw to the acre, and for economy I use the same straw repeatedly. In order to get manure upon the ground in the fall I rake off the straw, and to prevent it from rotting during the winter I put it up in small stacks.

HEDGES OF OSAGE ORANGE.

Mr. Quinn:—I never was more gratified in my life than by a recent visit to the farm of Mr. Bell, in Monmouth county, N. J., in seeing his hedges of Osage orange. He has his farm completely fenced with these hedges from two to eight years old. All that are five years old and upward are completely impassable by man, beast or bird. I was very much surprised at their success.

Mr. Robinson:—And there is another thing that would surprise Mr. Quinn quite as much. If we should have a cold night, with the thermometer 20 or 30 degrees below zero, these hedges would be utterly destroyed, so that there would not be a vestige remaining. This has been repeatedly experienced on the Western prairies.

Dr. Ward:—I have had hedges of the Osage orange growing since 1850, and have never known them to be injured by cold except the extreme ends of the limbs. My latitude is about the same as that of Monmouth county—the latitude of this city. I have tried a great many things for hedges, and have come to the conclusion that the best for a fence is the Osage orange, while for ornament I decidedly give the preference to the Norway spruce.

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Correspondence

Flat-faced Frictional Gearings.

Messrs. Editors:—As your paper is one of the principal mediums for the diffusion of useful knowledge, especially in relation to mechanical affairs, I desire to give to the public through its columns a statement of experiments and results in running machinery by friction instead of by belts in getting up the requisite motion for the various operations in any manufactory.

The experiment was first tried on an extensive scale, in this region—and, so far as I know, anywhere—by Mr. Charles Lamb, an enterprising and successful sawmill owner in Clinton, Iowa, and it proved so successful, economical and handy under his management that within the past year all the other sawmills (seven within a circuit of two miles aronnd his) have, at great expense, remodeled their machinery so as to adapt it to this new device. Two of these mills beside Mr. Lamb's are gang mills, and the others run muley and rotary saws.

This general introduction of it by all those best cognizant of its value and defects is proof positive that it is just the thing, and that the knowledge of it should be spread abroad so that all others may avail themselves of its advantages.

I will now, as well as I can, describe the mode in which it is applied.

The motion to the main shaft is of course produced by the engine crank direct, or the water wheel, as the case may be.

Upon this shaft are built strong wooden-faced pulleys, as in the old manner of belting from it, except that it is necessary that these pulleys be built entirely of their segments, presenting as little end grain of the wood to the surface as possible, and that the wood of which they are made be soft and tough. Basswood is said to be the best for this purpose, though soft maple or cottonwood, or any soft wood, will answer.

These pulleys may have faces parallel to their shaft, or be levelled at any angle required, to suit the direction of the various countershafts drawn by them. They must be put up strongly with their segments, glued or painted together, and their faces turned off with great accuracy.

Upon each countershaft required is placed a strong iron pulley of the same face as that on the main shaft that is to drive it, but its diameter may be made to suit the motion required. This pulley should be near the end of the shaft, and may overhang or not the movable bearing, by the motion of which, applied by levers, it is forced against the face of its driver. The motion required to place it in contact or remove it from contact is so slight—less than the eighth of an inch—that it has no influence on the correct running of the shaft. The box that supports the shaft should be made to slide upon an iron plate as a support, with short slots and bolts to hold it to its place, and some "process" to which a lever may be attached by which the workmen can command it.

In most of the mills here each separate machine—gangs, muleys, rotary saws, lath, shingle and planing mills are now run by its own countershaft, geared either to the engine shaft or to some one of the main countershafts, thus allowing each workman to stop or start his own machine in an instant, without interrupting any other, and without having to throw off or put on belts, entirely doing away with the necessity of using loose pulleys. This and the saving of belts is the great advantage arising from its use.

It is claimed by Mr. Lamb that the power required to do a certain amount of work is no greater when applied in this way than in the old style. Two or three mills here that have been modelled over on the friction principle, now do as much if not more work with the same engine and boiler.

And now in relation to the size and face of pulleys required to use up a certain amount of power. It does not appear that it makes much difference what is the relative size of the two pulleys rubbing together. Their faces of course are equal. As a general rule, I think they should have about one-third more face than if run with a belt. Mr. Lamb runs two gangs, each with a pulley of about 24 inches face and 3 feet diameter. A mulay or rotary sawmill can be run with a friction pulley of 12 to 16 inches face. I am running a heading circling machine and small edging saw together with a pulley 10 inches diameter, 6 inches face, working much more effectually than the same pulley did with a 4-inch belt, and less heating of the boxes.

I think 50-horse power may be applied to a pulley of 20 inches face without danger of loss by slip, and without the necessity of pressing the surfaces so tight together as to wear or heat the bearings more than the pull of a belt of about the same capacity would.

The more rapid the motion the more effective will be the friction contact with the same sized pulley. With very slow motion it does not do as well, and it is a better appliance for getting up motion than for reducing it.

I am aware that running machinery by friction is no new thing, but what I claim for Mr. Lamb and for this region is that we have demonstrated by extensive experiment that it can be economically applied to the propulsion of any kind of machinery, at a great saving of belting and time.

I hope that the hurried explanations I have made will be sufficient to enable any person interested to try it for themselves; but if any more is needed it will be cheerfully given. Chas. Boynton.

Lyons, Iowa, Oct. 2, 1864.

[The principle and the adaptation of frictional gearing to machinery is no new thing, but like many another one it languishes for some reason, for it is but little used. It is very many years ago that we saw a line of shafting driven by wooden friction gears, which had been in operation a long time. A question has arisen which we should be glad to see settled by positive demonstration; this is, whether friction gearing consumes more power than ordinary gearing. This is a mooted point, but one that is easily put at rest. Very many letters from correspondents have been published on this subject, but some of them are evidently the result of imperfect observation, or else merely state the fact of having used such gears with apparent economy. We shall take great pleasure in printing letters having specific information on this point.—Eds.

New Mode of Avoiding Scale.

Messrs. Editors:—Accompanying this you will find a sample of what I suppose to be sulphate of lime, the manner of obtaining which will unquestionably be of great interest to engineers who are compelled to use "hard water" in their boilers.

An engineer of this city having occasion to open a horizontal heater-box about six feet in length, and elevated six feet above the force pump, found floating on the surface of some water which had not been drawn off by the pump, a white powder, and which he concluded could be floated out and collected by inserting a small gas pipe half way up the side of the heater-box, so as to act as a waste-water pipe. By keeping the water in the heater on a level with the outlet of the pipe, and allowing it to drip rapidly, he has collected bushels of this substance, which would otherwise pass into his boiler and add largely to the scale deposited on the shell and flues. This appears to me to be a simple and effective contrivance, and well worthy of attention. The philosophy of it may be that by heating the water the sulphate of lime is set free and floats on the surface.

This same engineer uses green oak wood in his boiler to cut off scales, having tried a patent mixture without any benefit; however, his choice for this purpose is a half bushel of the bran of barley.

I ran a mill for several years, and found green oak sawdust to be the best material to prevent scaling; the objection to it is if the engine stands idle for a few days the cylinder, piston rod and slide valve rust excessively. J. T. D.

Springfield, Ill.

[On testing this powder with sulphuric acid we find it to be carbonate of lime—just the thing for scale. It may contain a trace of sulphate of lime, magnesia and other salts, but if so it is only a trace. As carbonate of lime is less soluble in hot than in cold water, it is not strange that it should separate when the water is heated. We do not understand why it should rise to the surface. This plan for partially purifying water before it is admitted to boilers is well worthy of attention.—Eds.

The Oil on a Kerosene Lamp.

Messrs. Editors:—Your explanation of "The Moisture on a Lamp Chimney," in the Scientific American, for Oct. 1st, suggests to me, what I wonder I have not thought of before, to ask of you an explanation of the deposit of petroleum, continually being made (no more or less rapidly while burning than at other times, as I can discover), upon a petroleum lamp. Respecting this deposit I have observed two peculiarities. 1st, While it is so abundant upon the globe and the burner as to soil whatever touches them, there is none perceptible upon the chimney, and none upon the pedestal and surrounding objects. 2d, After the lamp has stood a day or two there is no further accumulation of the deposit upon it. If you, or any of your readers, can give the true philosophy of this, you or some one else will probably soon be able to suggest a convenient remedy of what is at present a very great annoyance. T. H.

Fall River, Mass., Oct. 3, 1864.

[Petroleum is more subject to capillary attraction than any other substance known, and we presume the phenomenon observed by our correspondent is due to this property. The fluid climbs up the wick and so over upon the outside of the lamp. Its progress would be facilitated by the presence of dust upon the lamp.

Machinery vs. Man-power.

Messrs. Editors:—Knowing that you like to hear of anything remarkable in the way of labor-saving machinery, I herewith send you something astonishing in the way of machine planing. Messrs. S. & G. Rork, of this city, received orders this morning to tongue and groove 4,000 boards. The captain, who was to carry the stuff, being in a hurry they put their machines to their highest speed. Noticing the remarkable speed with which the boards went through one of the machines I thought I would time it, and found that 19 boards passed through in two minutes, this would be 570 in an hour, and 6,270 in a day (11 hours being the mill day). A man, at a liberal estimate, could not put in a tongue and groove and plane more than four boards an hour; so that this machine, with one man feeding and two men taking away, did as much work as 142 men. Is not this saving labor? T. A. McIntyre.

Albany, Oct. 10, 1864.

Who has a Bread-slicer?

Messrs. Editors:—In our large establishment it is desirable to have bread cut in a time, and labor-saving manner. I have searched the city through in my efforts to find a suitable machine for the purpose, but without success. Can you inform me if there are such things made, and if so where they can be seen?

Charles C. Burns.

Philadelphia, Oct. 7, 1864.

[We should think some of the small tobacco-cutting machines might answer, if they are not too costly and complicated. We have had many inquiries for a handy bread and meat slicer, but doubt whether there is such a thing. Inventors should take the hint.—Eds.

NEW BOOKS AND PUBLICATIONS.

History of the Processes of Manufacure and Uses of Printing, Gas-lighting, Pottery, Glass and Iron. Illustrated. John Bradburn, Publisher, No 49 Walker street, New York:

The growing interest which attaches to all industrial works, or those which treat lucidly and practically of the arts and sciences, will, no doubt, secure a wide circulation for this volume, more especially since it is compiled from the *Encyclopedia Brittanica*, a standard work of high character. The popular magazines find no articles so attractive as those which give detailed accounts of manufacturing operations. In this volume the different trades alluded to are illustrated and treated at length in a comprehensive manner, and the reader may derive much valuable information from a perusal of it. Doubtless further extracts from the authority in question would prove acceptable to the general public and profitable to the publisher.

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MR. RUGGLES AT NEW HAVEN.

On the 27th of July a semi-centennial address was delivered before the alumni of Yale College, by Samuel B. Ruggles, LL.D., and it has been published by D. Appleton & Co. in a neat pamphlet. We find it filled with interesting statements, some of which we extract:—

THE PTOLEMAIC THEORY ONCE TAUGHT AT YALE.

The fact is strange and curious, that even here in emancipated America, the Ptolemaic or geocentric theory, enforced by Papal assumption on the dark ages, was actually taught for several years, within these very walls. It was not until 1718, that the light of the heliocentric system was first let in, through the efforts of the clear-sighted Doctor Samuel Johnson, then a tutor in the College, and who in due season would have become its President, but for his ill-timed doubts of the validity of Presbyterian ordination. A copy of the "Principia," sent out from Europe, had reached the little college library, upon which the youthful Johnson entered with great avidity, after studying the higher mathematics for the purpose. "Till then," says his biographer, "the Ptolemaic system of the world was as strongly believed as the Holy Scriptures; but Johnson was soon able to overthrow it, and establish on its ruins the doctrine of Copernicus." The heliocentric system at once illuminated the College, and here it will continue to pour forth its magnificent light until the College, and the earth, and the sun, and the stars, shall be no more. Poor old Copernicus, who in his dying hours had sought, by a letter of dedication, to disarm the opposition of the Pope, was lying in his grave on the Baltic, carefully covered by the Papal excommunication, which was not formally annulled by the Vatican until the year 1821, seven years after our class left college. Since that time, the Church of Rome, claiming to be the chosen keeper and interpreter of Holy Writ, together with the residue of the Christian world, have permitted the students of the Pentateuch to read the Genesis by the light of Copernicus and Newton.

THE FIRST NOTIONS OF GEOLOGY.

In 1814 we left these walls under the belief that the world was just 5,818 years of age, and no more. In 1810, when we entered the College, Benjamin Silliman was in the early bloom of that noble manhood which has since borne fruits of such surpassing excellence. He had but recently returned from Europe, where he had gone to study with the ablest masters, the structure and history of the earth. The field was new and nearly untrodden; but in Edinburgh he had come in contact with fellow laborers, whose vigorous genius was grappling in the early morning light, with a gigantic cosmogony, just becoming dimly visible. The investigation required, at the threshold, a calm and careful inquiry, whether the "days" of the Genesis, as recorded by Moses, were necessarily limited to six diurnal revolutions of the earth on its axis, or could be fairly enlarged to embrace six great cosmical intervals of time. A devout Christian inquirer, like Silliman, immovably convinced of the truth of the Holy Scriptures, could not and would not decide such a question without long and conscientious study, and above all, the fullest examination of the facts.

I have already ventured to assert that in every wisely managed college, science and theology will be blended in due proportion, and that in this respect, the authorities of Yale have been singularly successful. The labors of Silliman, so far from weakening, have materially strengthened our faith in the inspiration of the Mosaic record. The flood of light which geology has shed on the cosmical "days" of the Genesis, has immeasurably widened the basis of our belief. By removing in all rational minds every apparent antagonism between Science and the Bible, it has practically established a *Concordat* with all the churches, reverently assigning to theology all the spiritual portion of man's complex nature, and committing to science only the lower and inferior office of discovering and declaring the physical laws and history of the material universe which he temporarily inhabits. So lively, however, is the perception of the comparative progress of the geological eras thus established, that Dana, in his admirable and exhaustive "Manual of Geology," complains, with something of American impatience, that "the earth dragged slowly through its early stages!"

NAPOLEON'S WORKS.

We began to perceive that, after all, the imperious but imperial Ruler had done some little good to France, and perhaps to the world, particularly in his civic administration in simplifying the law, introducing sound finance with a metallic basis, promoting scientific discovery, and eminently in the great public works, by which he strengthened and adorned his Empire. On the other hand, we discovered that some of the restored monarchs, in their exile, "had forgotten nothing and had learned nothing," but to do nothing for the general advancement of civilization and the good of man.

We may take, as a specimen, the immediate suppression in every part of Italy, by the dozens of fugitive princes, emerging from their hiding places, of the splendid "Metric System," which had been introduced by Napoleon, and was in general use throughout the Italian Peninsula; and the sudden resurrection, from all its nooks and corners, of the obsolete, worm-eaten, and widely varying weights and measures of the *ancien regime*,—not to mention the ridiculous restoration of the knee-breeches and wigs, and especially the *queues*, from which attenuated "caudal" appendage the reactionary party in Italy derived their diminutive or *sobriquet* of "*codini*." The English Tories may have dropped the *queues*, but they even yet retain much of the genuine spirit of the "*codini*;" for as late as the present year 1864, they resisted, in Parliament, the passage of a bill merely permitting the "Metric System" to be used in the United Kingdom; and expressly on the ground that it was the offspring of the French Revolution. The International Statistical Congress at Berlin, in September, 1863, unanimously passed a resolution in which the delegate from the United States actively concurred, recommending to the "Inspectors of Schools," of the various nations of the civilized world, to introduce the study of the "Metric System" in all schools subject to their authority. The schools of the United States, being subject exclusively to the government of the separate States their separate action is necessary. The Legislature of Connecticut, in June, 1864, passed a resolution, introducing the study into all her schools. Between the years 1842 and 1860, Sardinia, in her career of reform, had gradually retraced her steps; so that the "Metric System" is now legally re-established in every part of Italy, except Rome and Venice.

CONCLUSION.

Let us not forget, that of this bright and rapidly coming future, even we, of the time-worn class of 1814, are still a part; that our race is not fully run, and that much may remain even yet for us to do. While we mourn the cruel and unmerited sufferings of loyal men and of loyal women, both in the North and in the South, let us exert, to the last and to the uttermost, every faculty of our nature, to uphold that glorious Union committed to our keeping by our honored fathers, with the solemn and undying conviction that the tranquility and happiness of a continent, not for a day, but for centuries to come, are staked upon the pending conflict.

Above all, let us ever devoutly trust to the wise and comprehensive Providence of God, and always bear in mind, that in the inevitable logic of events, guided by His superintending hand, every present evil contains, within itself, the germ of great and lasting good. If history be philosophy teaching by example, let us reflect, that two centuries ago, the awful fire of London drove out the plague forever; that even in our day, the dark and dingy lanes of Hamburgh, abandoned to the flames, gave birth to a new, and powerful, and brilliant city; and that the continental Republic of the western world, chastened by adversity, and purified by fire from blot or stain, may soon be found calmly but proudly resuming its accustomed march, advancing with firm and unbroken step, onward and upward into the coming ages.

A REDUCTION has been made in the cost of telegrams in Paris. A message can now be sent to any part of Paris for fifty centimes (10 cents) and the administration guarantees that it shall be delivered within half an hour from the time it is dispatched.

Pittsburgh Cast-steel Works.

The Boston *Commercial Bulletin* gives an account of a visit to the cast steel manufactory of Hussey, Wells & Co., at Pittsburg, from which we take the following extracts:—

"From twelve small furnaces in 1859, with about twenty-five men, the Hussey, Wells & Co.'s works have increased to ninety furnaces now in full operation, which, with thirty more that are nearly ready to start, will make one hundred and twenty melting furnaces, while the force of operatives is increased to about three hundred. An idea of the enormous expense of running these great establishments may be obtained from the fact, that this one consumes about one hundred and forty tuns of coal a day, and in full operation consumes two hundred and forty crucibles a day, each crucible costing at present prices four dollars each, the total daily expense for these crucibles alone foots up the pleasant little sum of nine hundred and sixty dollars.

"Although Messrs. Hussey, Wells & Co., are not the first who commenced the manufacture of steel in this country, they are, we understand, the first that have succeeded in making the finer qualities of cast steel, such as is used for edge tools, drills, etc., and in this theirs may be denominated the pioneer establishment of this country. They have supplied New England with a large portion of the steel used here for the manufacture of cutlery for nearly three years past, and the Cliff, North Cliff, Northwestern, Pontiac, Bay State, and other Lake Superior copper mines with drills and other mining tools; also the Denver and Colorado mines. The plow and axe manufacturers draw on them for their material, and D. Magdoll & Co.'s Hammer Works, the largest in the country, at Norwich, N. Y., puts the Hussey & Wells steel into his nail drivers; the Ames Manufacturing Company, at Chicopee, and other sabre and sword factories, also make their drafts on this establishment for the material for making those cutting arguments against the enemies of the Union, and aver that in this American steel there is far less breakage, and it does not crack like other kinds. Railroad men commend the locomotive cast steel springs as the best they have ever used, and less likely to break or 'lose their set' than any other.

"This American cast steel is declared by all edge tool manufacturers, machinists, plow-makers, hammer-makers, sword-makers, railroad men, miners, and in fact all who make and use articles requiring the finer qualities of cast steel to be far superior to the best English steel. This has been decided after the most thorough and severe tests, and is now a fact generally acknowledged. So in this instance, at least, we may hurrah for American manufactures which shall beat the world ere long, and if our Congress will but make the tariff high enough we shall soon be able to introduce a competition among our own steel manufacturers so that consumers will obtain their supplies here and not go abroad for them, the only importations to be that of the skilled laborers and artisans who shall come here for the better returns and advantages to be obtained for their labor. These works when fully completed this fall, will turn out twenty tuns of cast steel a day, a larger amount, we think, than can be produced by any other establishment in the country."

The Age of the Tides.

After the reading of a paper on the tides, before the British Association at its recent meeting, Professor Rankine said that it was perfectly well known that water moved miles horizontally, while it moved only a few feet vertically. If earth was covered with an ocean of a uniform depth, the tides could be easily calculated in a mathematical way, but the irregularity of the depths of the sea, and the shape of the continents, made it complicated. This was so important that gentlemen who were employed in such investigations would do well to give their minds so as to devise some means of recording horizontally, as well vertically, the motion of the water.

Mr. Parkes said that there was one very curious thing in connection with diurnal tides. The tides, as they were aware, were one and a half to two days' old according to the coast. At Bombay they were one and a half days' old; that was the semi-diurnal tide. But the diurnal tide was not more than a few hours old. Tides of a longer period were much more accelerated by friction than tides of a shorter period.

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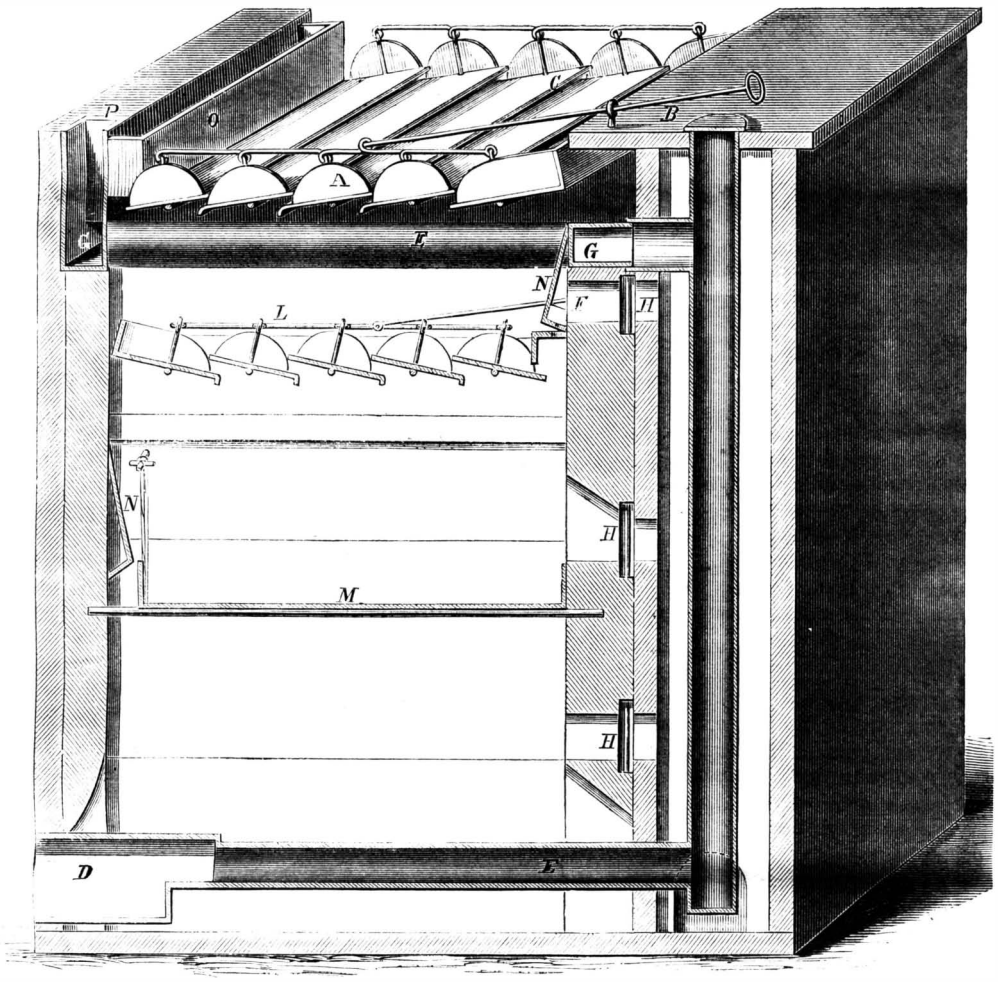
Improved Grain Dryer.

The chances of trade and the processes of nature, cause grain to sweat and ferment when stored in large quantities, unless it is properly dried. To effect this it is necessary to subject the staple to a gentle heat so as to drive off the moisture contained in it.

The engraving published herewith represents an improved grain-drying kiln which is constructed as follows :—The grain is placed upon the trays, A, which consist of separate leaves, swung by separate rods from the main rod, B. These trays are so swung that the weight of the grain will preponderate on the upper edge, C, and thus cause all the trays to close on each other automatically. When the grain is on these trays a current of heated air ascends from the furnace, D, through the flues, E, and the passages, F, to them. The flue, G, runs cross-ways of the kiln, and there is a valve, H, in each passage, by which the heat under any of the trays may be cut-off.

When the grain has been sufficiently dried on trays it is dumped from them, by moving the main rod, B, on the second series, L, and a fresh charge laid on the first ones just emptied. From the second pans the grain is again dumped at the proper time on to the platform, M, which is one continuous floor, where the drying is finally completed; thus three charges are drying at once; suitable deflectors, N, guide the grain in its passage from the trays to the lower platform. There are strips of metal, O, at the ends of the upper trays, which prevent the grain from sliding off there. All the flues communicate with the discharge flue, P. The bottoms of the trays may be perforated if desirable, so as to allow the heated air to pass through, and it is intended in practice to use superheated steam on the upper trays, leaving the floor to be acted on by hot air. The steam pipe will pass up the main flue and through the passage, F. The tops of the trays will then be covered steam-tight, with an escape-pipe and damper fixed in the cover instead of being left open, as shown. The inventor says that wet wheat dried in his machine weighed 50 pounds to the bushel against 45 pounds to the bushel dried in another kiln, both lots being from the same cargo, and having been wet the same length of time. The increase of weight he attributes to the action of the superheated steam, "for as the steam rises from the lower floors it is superheated in its passage, and ascends to the upper trays where it is absorbed, and, as a consequence, the grain retains more substance than where the steam passes directly out."

With this machine one man is capable of drying from 10 to 5,000 bushels per hour, according to the capacity of the dryer. The quantity of fuel is one cord of wood to one thousand bushels of grain, which may be reduced where a steam engine is used, as the heated air from the boiler can be turned to advantage. This is a convenient and well-arranged machine, and will doubtless give good results when properly managed. It was patented on the 13th of September, 1864, through the Scientific American Patent Agency, by John Babillion, of Detroit, Mich., from whom all further information can be had. The entire right is for sale.



BABILLION'S GRAIN DRYER.

THE Berkshire Woolen Co., at Great Barrington, are manufacturing some cloth for A. T. Stewart, of New York, at the rate of $11 a yard.

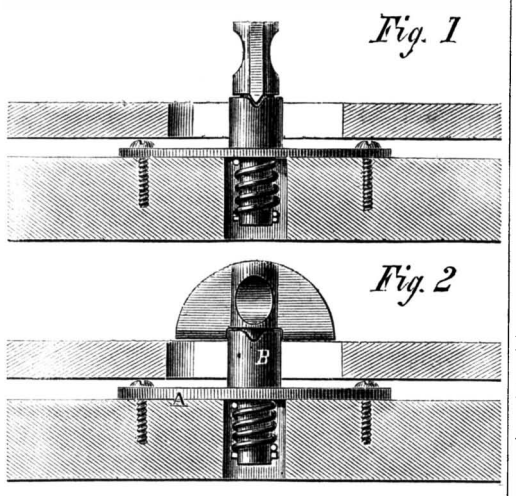
A NEW PHRENOLOGICAL BUST.

The attitude of the world of Science toward the parvenue, phrenology, still continues one of doubt. "We do not yet know whether the new comer is a rocket, shooting a few yards into the atmosphere, or a star, kindled and set forever in the depths of the firmament." There is, however, a growing disposition to recognise a correspondence between the general form of the head and the general cast of the character. It is admitted that no cases can be found of decidedly superior intellect accompanied by very small frontal portion of the brain ; or the manifestation of gross animal passions with a small development of basilar region of brain.

Messrs. Fowler & Wells, 389 Broadway have just put in market a phrenological bust well adapted to the position which phrenology occupies. One half of the head is marked off with the organs in the usual way, while the other half is marked only with the general divisions, moral sentiments, intellectual faculties, etc.

REED AND PACKARD'S SPRING-CATCH BUTTON

When a shower comes up an open carriage is an unpleasant vehicle to be caught in. There is hurrying to and fro on the part of the occupants to get the top up and the side curtains down, and before this is done one is likely to get wet to the skin. The curtains can't be buttoned over the studs, and time and temper are alike wasted. With this simple button the task may be accomplished with great ease. In Fig. 2 it is shown broadside to, or in, the position when the curtain slips over it. By simply turning it across, as in Fig. 1, the curtain is secured much better and quicker than with the old-fashioned arrangement- There is a small spring below the plate, A, which is let into the bow, or other part of the vehicle, and a notch in the tube, B; a projection fits into this notch and holds the button in position, open or closed as desired. This button was patented on Aug. 23, 1864, by T. K. Reed and H. F. Packard; for further information address the inventors, Reed & Packard, North Bridgewater, Mass.



Wrought-iron Rifled Guns.

The United States Government has sent several experienced officers of the army to test the Ames wrought-iron gun. The test requires one thousand shots to be fired from the gun. The test is taking place at Bridgeport, Conn., and thus far one hundred shots have been fired; it shows that, with twenty pounds of powder and fifteen degrees elevation the gun throws a shot four miles. It yet remains to try the full charge of 25 pounds, which, with a greater elevation, may be expected to realize the seven miles range attained in the private trial made a few weeks ago. These guns are molded solid throughout. The section around the bore is molded first, and by each subsequent heat the molds are extended outward. Each section is composed of three rings; the first has a diameter of ten inches, with a hole in the center. This ring is accurately turned to fit inside of a second, which is also turned to fit the third and outside ring, each course being six inches thick. This furnishes not only purity in the metal, but the most perfect solidity throughout the entire mass. The hole at the center permits the impurities of the metal to be worked out from the inner rings, while being heated and hammered, while the scales which may accumulate on the outer rings are permitted to fall outward as the weld extends toward the circumference.

To Remove Silver Stains.

In the *Photographischer Archiver*, M. Obernetter recommends a concentrated solution of perchloride of iron as a detergent for silver stains on the hands or clothes. If gallic or pyrogallic acid has been used it will be necessary to wash the spot afterward with a few drops of a strong solution of oxalic acid. A weak solution of this salt is also useful for diminishing the intensity of negatives to be copied in the solar camera. Weak negatives may be transformed into strong ones by using first a solution of chloride of iron, and secondly with pyrogallic acid and nitrate of silver.

TWENTY-FIVE DOLLARS A BUSHEL.—Among the pears exhibited at the recent fair of the Horticultural Society of the American Institute was one bushel of Duchesse d'Angoulemes, which was sold after the fair for $25. There were 61 pears in the bushel; they, therefore, brought 41 cents apiece.

THERE are now building for the through broad-guage routes from New York to St. Louis (1,200 miles) one hundred and fifty locomotives, five thousand freight cars, and elegant passenger cars in proportion.

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COSTLINESS OF COMPLICATED STEAM ENGINES.

Some men design steam engines without the slightest regard to economy of construction, to say nothing of their duty when at work. Link is piled on link, rod succeeds to rod; devious, winding, tortuous passages, as intricate as the Cretan labyrinth, and as contracted as the mouth of a miser's purse, are found in abundance, and there seems to be nothing but an insane desire manifested to be different from some other builder. The constructor feels this fault and the owner of the engine has to pay for it; in the end the designer loses his reputation

Drawings are sent to the foundry with piece after piece to be cast together, when joints and bolts should be used instead. Air pumps and condensers are cast on bed plates, great long legged columns for cylinders to set upon are also cast in, and each particular piece is often broken or cracked before it leaves the pit from the effects of expansion and contraction, which the foundryman strives in vain to prevent. Crooked cores, and water or steam ways unnecessarily long and inaccessible, are a vexation from beginning to the end. To the pattern-maker who makes the boxes or the sweeps, to the molder who sets the cores in place, to the laborer who cleans the cores out, and to the engineer, who suffers from the injury caused by the failure to remove the sand entirely, these things are alike a vexation and a loss. When steam chests and small valve seats that require to be bored in a lathe are cast on cylinders, very great unnecessary expense is entailed which ought to be avoided. The cumbrous casting has to be turned and laid in all possible positions to get at the job, and to do an hour's work on some special part, the labor of ten men and their time is required to put the casting in position for the machinist. We are not imagining cases. Examples of the bad practice here alluded to are fresh in our mind. Time, which involves more than money in a machine shop, is lost, and means squandered in devising special machines to accomplish some of the tasks presented for the ingenuity of the machinist to overcome.

No engine performs any better or burns less fuel for having a fancy exterior, and every engine loses a notable per cent of the coal put into the boilers to drive the piston, by having cramped steam and exhaust ports, crooked water passages in the pumps, a wilderness of pipes through which the steam and water must pass in and out, and a bristling array of levers, to maneuver which makes a true engineer tear his hair merely to look at. Time was of old when men built engines with as many rods, levers, counter-weights, cranks, bell-cranks and what not, as it was possible to get in the machine. The side lever engine is an example. We regard it as a favorable sign that none of these machines are now built in this country, and creditable to our sagacity that but few of them ever were made. The vertical engine, the oscillating, and the beam are the chief varieties, and with those who regard engineering science in its proper light simplicity of construction and harmony in the design are prime requisites.

WELDING BY PRESSURE.

When a machinist drives a dry key into a dry key seat it sticks fast and cannot be got out, oftentimes, without drilling it. In this case the surface fibers of the material are interlaced, and are as firmly united as if they were one. The same action takes place in drawing metals, and an English company, working a patent for a peculiar method of drawing metal tubes, have found that where one tube has been forced over another a perfect union takes place, and no joint can be discovered when they are cut across. When a blacksmith unites two pieces of iron the heat and the percussion of his hammer effects nothing more than an intimate union of the two parts. If he had sufficient strength, and applied it in the proper way, he might join two pieces of iron quite as well cold as hot.

It will probably be some time, however, before we have machinery sufficiently powerful to unite masses of metal so that they shall be practically welded, and break at any part rather than at the points of junction. Could such machinery be devised or rendered practical in its results, it is easy to see that an immense saving would be gained in point of time. In some kinds of work this cold welding, so to speak, is already done. Car wheels are pressed on to their axles and remain fast without any key. This is not due to merely pushing a large body into a bore slightly smaller, for if the machinist leaves the axle too large the wheel stretches or splits, and the job is not properly done. The wheels stay on the axles because the two metals, although of different natures, one being cast and the other wrought, have an intimate relation with each other, amounting to an absolute surface weld; very many wheels split before they can be removed.

Welding by pressure and by heat in connection with pressure has been experimented with abroad. *Galignani's Messenger* speaks of a case, which we here append:—

"Experiments have lately been made at Paris by M. Duportail, engineer, in the workshops of the Western Railway, to ascertain whether iron might be welded by hydraulic pressure instead of by the sledge-hammer. The latter, indeed, has not a sufficient impetus to reach the very core of the metal, while continuous pressure acts indefinitely to any depth. In the experiments alluded to M. Duportail caused two iron bars, 1½ inches in diameter, and heated to the welding point, to be placed between the piston and the top of an hydraulic press. The bars were welded together by this means with extraordinary ease, the iron being, as it were, kneaded together, and bulged out at the sides under the pressure. The action of the press was suspended when the part welded was brought down to the thickness of the bars. After cooling, the welded part was cut through to examine the inside, which was found perfectly compact. To try it, one of the halves was placed under a forge-hammer weighing 1,800 kil., and it was not until the third stroke that the welding was discovered."

Heavy steamboat shafts are very often hollow at the center from a want of power in the trip hammer, or through an imperfect manipulation of the "pile" they are fagotted from. Masses of hot metal drawn between revolving rolls are indeed subjected to pressure, but the iron thus made is not of so good quality as hammered metal. It is not in connection with preparing iron for market that these remarks are made, but it would seem not at all impracticable to make a neat and perfect weld by heavy continuous pressure for a short time, rather than by the ordinary method of hammering. Time would be gained both in the smith and finishing shops. That it is perfectly feasible there is no question, and for heavy connecting-rods, rudder-posts, keels of iron vessels, or similar parts, a great economy of time would be apparent, while equal, if not better, workmanship would result.

WHY CAKE TASTES OF TURPENTINE.

We are told by a person of experience in cooking, that if in using oil of lemons to flavor her cakes she gets too large a quantity, she will frequently have the exact flavor of spirits of turpentine. It is probable that the oil of lemons is actually changed into oil of turpentine.

An atom of the oil of lemons is composed of 20 atoms of carbon and 16 atoms of hydrogen, C_{20} H_{16}, and oil of turpentine has precisely the same composition, C_{20} H_{16}. The two substances are isomeric. Among all of the wonders of chemistry there is none more wonderful than this principle of isomerism. That two substances composed of the same elements in the same proportions should vary so greatly in their odor, flavor and other properties as oil of turpentine and oil of lemons is a puzzling mystery.

The oil of turpentine is isomeric not only with oil of lemons, but also with the oils of oranges, cloves, camomile, thyme and bergamot. All of these are composed of only the two elements, carbon and hydrogen, and all in the same proportions, C_{20} H_{16}. The great difference in the odor and flavor of these several substances is to be accounted for only on the supposition of a different arrangement of the atoms. It is not difficult to conceive that if an atom of the oil of lemons is subjected to certain influences, that peculiar arrangement of its 20 atoms of carbon and 16 of hydrogen which gives it its peculiar properties should be broken up, and these atoms should receive that other arrangement which produces the properties of the oil of turpentine.

Heretofore chemists have not known what conditions were requisite for effecting the change in these two substances, so as to transform oil of lemons into oil of turpentine, and if our informant is correct in her observation she has made an interesting discovery in chemical science. But in other cases the transformation of one substance into another of the same chemical constitution is not only understood by chemists and practiced in the laboratory, but conducted on a large scale in the industrial arts. An atom of starch is composed of 12 atoms of carbon, 9 of hydrogen and 9 of oxygen, C_{12} H_9 O_9, with the addition of water, and sugar has precisely the same constitution. When a kernel of barley or other grain sprouts and begins to grow, the starch which it contains is transformed into the isomeric compound, sugar. It is for the purpose of effecting this transformation that grain is malted. The sugar thus produced is afterward converted into alcohol by fermentation. Thus the production from grain of beer, whisky, and all other fermented and distilled liquors, and therefore the great industries of brewing and distilling, as well as the prevalence of intemperance, with its immeasurable evils, all depend upon the power of transforming one substance into another of isomeric constitution by simply changing the arrangement of its atoms.

THE RUSSIAN MONITORS AT SEA.

One of the Russian monitors has recently had a trial trip and the results are thus described by the *Messenger de Cronstadt*. This journal gives a detailed account of the trip from which we make the following extract:—"The monitor *Vestchoune*, accompanied by the steam-vessel *Vladimir*, and hoisting the flag of Rear-Admiral Likhatchew, chief of the ironclad squadron, left Cronstadt August 3, and, after touching at one or two ports, entered Reval on the 5th, which place she left on the 8th, at 8 30 A. M., and at 4 P. M. reached Helsingfors. In this trip she had to contend against a rough sea, which washed over the deck, and the waves even at times reached the top of the turret. Notwithstanding this the monitor behaved admirably, and did not lesson her speed for one moment. Her engines worked well, as did also the isolating apparatus on which the compass rests, in order to protect the magnetic needle from the action of the iron and to diminish its declination. This apparatus consists of a long copper tube, in the interior of which the compass is fixed with the Mariner's card reversed, but reflected in a mirror. On the 11th the *Vestchoune*, still sailing in company with the *Vladimir*, again set sail, and on the 12th, after a short stoppage at Glasholm, they continued their cruise in the vicinity of that place. However, the wind having freshened, a heavy sea arose, and the waves were

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again thrown on the ironclad's decks. She rolled in a peculiar manner, quite different to that of other vessels. Her oscillations described angles of 7½ and and even 8 degrees. Notwithstanding this she steamed ahead quite well, and her engines continued to work in the most satisfactory manner. The vessels entered Routchesalm to await the subsidence of the gale, and on the 14th steam was again got up and they crossed the reefs, meeting a heavy sea, which the monitor encountered as well as possible. Anchor was cast at Transund, whence the route was continued to Cronstadt, which was reached on the 17th at 6 in the morning."

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week ; the claims may be found in the official list:—

Ejector for Oil Wells, &c.—This invention consists in procuring oil, water or other fluids from artesian and other wells by a new and peculiar mode of forcing air up the usual tubing by means of a forcing pump through an inner pipe to which is attached a nozzle of peculiar construction, which is term an "ejector," and which is so applied as to direct the compressed air upwards within the well tubing in a thin continuous stream, which thereby induces or causes a current of the contents of the well to ascend in a continuous stream to the top, where it is discharged into a proper receptacle. G. M. Mowbray, of Titusville, Pa., is the inventor.

Improvement in Horse Covers.—This invention consists in providing ventilating louvers in a horse cover, by which the excessive heat and perspiration that now attend the use of horse covers when the animal is at work are avoided, and a perfect ventilation is maintained about the back and loins of the animal, whilst he is perfectly protected from rain, snow, and inclement winds. E. L. Perry, of New York city, is the inventor.

Shade Fixture.—This invention relates to an improvement in that class of shade fixtures in which the shade roller is provided with a spiral spring for the purpose of automatically winding up the shade. The invention consists in providing the shade roller with a stop or fastening composed of a pawl which engages with notches in a hub attached to one of the end plates of the roller, all being arranged in such a manner that the shade may be retained or held at different points or hights in the length or scope of its movement, and the shade adjusted by a simple manipulation of the same, the usual cord for operating or turning, the shade roller being dispensed with entirely as well as counterpoises, which have, in some instances, been employed in connection with spring rollers for holding the shade at any desired point. S. Hartshorn, corner 4th avenue and 10th street, New York city, is the inventor.

Propeller and Steering Apparatus.—The inventor of this propeller, Mr. Henry Ressel, is the son of Joseph Ressel, who took out a patent in Austria on a screw propeller in 1827, and had the same practically tried in 1829 on the steamsr *La Civetta*, in the harbor of Trieste—the first trial of a screw propeller on record. The object of this invention is to render the use of a propeller as a steering apparatus practicable on vessels of any kind and size, and particularly on war vessels. Heretofore it has been considered impracticable to use a propeller as a steering apparatus on sea-going vessels, and the attempts made to effect this purpose have been confined to small vessels running on inland waters, particularly on account of the great difficulty to produce a strong and durable joint between the main driving shaft and the propeller shaft. The joint which forms the subject matter of this present invention is composed of a socket attached to the main driving shaft, and provided with two or more studs which project in segmental grooves in the ball or globe attached to the propeller shaft in such a manner that the propeller can be moved to an angle of 37° degrees (more or less), to either side of its normal position, without interfering with its connection with the main driving shaft, and that it can be rotated when in an angular position with comparatively little friction. The globe is protected by a hemispherical cap and semicircular rings placed in circular grooves cut in the journals and journal boxes of the propeller shaft, relieving the studs in the ball and socket joint from all strain in the direction of the shaft. This invention has been assigned in full to Dr. M. Priester, of 451 Grand street, New York.

Device for Transmitting Motion.—The object of this invention is a simple and effective device to overcome the dead center in machines, in which reciprocating motion is to be converted into continuous rotary motion. The invention consists in the use of two shafts, which are connected by a belt or provided with a fly-wheel, each in combination with an eccentric, or one connecting with a crank on the other shaft, and with the main crank that connects by a pitman or other suitable means with the crosshead of a steam engine or other source of power, in such a manner that by the combined action of the cranks, eccentric, and flywheel or flywheels the dead centers are overcome, and the reciprocating motion of the piston of the engine or other prime motor is converted into continuous rotary motion. John W. Browning, of Mattoon, Ill., is the inventor.

Apparatus for Setting Off Blasts.—The principal object of this invention is to enable miners in setting off blasts at the bottom of a shaft to to get away before the explosion takes place, or, in other words, to enable a man engaged in blasting rocks to set off a blast from such a distance that he is perfectly safe from injury.

The invention consists in a barrel, provided at one end with an opening to receive the end of the fuse, and with a spring catch or dog to hold the fuse in said opening, and furnished in its interior with a nipple and spring piston or hammer, said dog and hammer being provided, one with a prop and the other with a trigger, which are connected with each other by means of a chain or cord, in such a manner that when the barrel is secured to a fuse by the dog and the hammer is set or worked by pulling a cord or chain connecting with the trigger, the hammer is relieved and a percussion cap placed on the nippel in the barrel is exploded, thereby setting fire to the fuse, and at the same time the dog releases the fuse and the barrel can be hauled in or up out of harm's way before the explosion takes place. J. E. Hughes, of McCartysville, Cal., is the inventor.

MISCELLANEOUS SUMMARY.

The Atlantic Cable, which is to be laid next summer between England and America, was recently tested to try its strength and ductility. A given length was taken, suspended, and gradually weighed until it broke, the elongations succeeding each additional weighting being duly registered. The cable selected bore the weight of six three-fifth tuns. The case, the spiral wires involving it, the insulating body, the jute yarn, and each separate strand of the cable were similarly tested. It was found from those experiments that the more the fibers of wire were brought into a state of tension, the greater became its strength, and that as an insulator gutta percha, although not so perfect as India-rubber, is far more durable. and that the cable as now manufactured will be able to bear a strain four times its own weight when laid at the bottom of the Atlantic.

Recovering a Sunken Engine.—The *Mechanics' Magazine* says:—"The *Matilda*, a twin screw steamer, built for the blockade service, and fitted with costly engines, was wrecked last spring on her trial trip near Lundy Island. Mr. M'Duff, of Portsmouth, with Messrs. Palmer and Hicks in their vessel, the *War Hawk*, have recovered most of the valuable property on board. M'Duff, equipped in Mr. Siebe's diving apparatus, has taken her engines to pieces, and sent them up. He has worked six hours a day, unscrewing bolts, etc., as if he were in a factory on shore, instead of being 42 feet under water, and exposed to a ground swell setting in from the Channel."

A Glass Steam Engine.—The troupe of glass-blowers at Hope Chapel furnish a very interesting evening's entertainment for those who are fond of practical things. A steam engine, most beautifully constructed of different colored glass, is working by steam all the time. The nature of the material affords an opportunity to see all the several parts moving at once, and it is really a very curious sight, even to an engineer, and one that will well repay a visit.

An invention for the recovery of sulphur from the waste produced in the manufacture of soda has been provisionally specified by Mr. B. Jones, of Warrington, England. He allows hot water to flow over "blue waste" placed in a suitable vessel, and in a few hours he draws off the liquor. He precipitates the sulphur with hydrochloric acid, and then filters and evaporates to dryness. The precipitate is then treated in a furnace similar to that commonly used for producing sulphur from sulphur stone. He proposes to condense the sulphuric acid in a water tower and to collect the sulphur at the bottom.

Adulterated Beer.—The principal of the Inland Revenue Department of England has just examined twenty-six samples of beer, of which twenty were adulterated. In fourteen of these samples, he found the prohibited articles called grains of paradise—grains which, however, fit for Eden, are by law unfit for beer. In one of the fourteen he found, beside the prohibited grains, a portion of tobacco; in two others, cocculus indicus was present in large, and even dangerous quantities; two samples contained capsicum; and two others proto-sulphate of iron.

Cure for the Whooping Cough.—An effectual cure for the whooping cough, extensively practiced in France, Sweden, and England, is sending the patients to gas works to inhale the air from the purifying apparatus. A Mr. Backler, of London, says:—"It often occurs that as many as a dozen children are brought to the gas works at one time—and the managers have now come to regard this new custom as part of the daily routine of business."

A New Brunswick Pearl.—There is now to be seen at the store of Mr. Hutchinson a very fine pearl of unusual size. It weighs 27 grains, is perfectly spherical, without a flaw or defect of any kind, and is valued at between $130 and $150. This fine pearl was taken from a common mussel, in Stone's Brook, near Penobsquis Station, and has caused quite a search in the neighborhood, which has resulted in the discovery of smaller ones.

Anti-Incrustation Powder.—Mr. H. N. Winans, of this city, has been for many years engaged in the sale of a powder to remove incrustations from steam boilers. Judging from the testimonials of its efficiency shown us, it is a valuable article, and one calculated to prevent the evil referred to. An advertisement can be found on another page.

Petroleum Discovery near Rochester.—The City of Rochester, in this State, is excited by the discovery of petroleum in that vicinity. The lands have been leased, a company has been formed, and steps are being taken to sink a well without delay.

Tuns of cucumbers are annually sent to this city every fall to be made into pickles. For Westchester county alone the product this year is set down, by good authority, at $1,300,000, cash value, or 130,000,000 cucumbers.

In the illustration of Dykeman and Bolton's Variable Exhaust, given in our last number, the address was erroneously given "Harlem Railroad." It should have been *Hudson River Railroad.*

Binding the "Scientific American."

It is important that all works of reference should be well bound. The Scientific American being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII., to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York

Back Numbers and Volumes of the "Scientific American."

VOLUMES III., IV., VII., AND X., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding VOLS. I., II., V., VI. and VIII. are out of print and cannot be supplied

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ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING OCTOBER 11, 1864.

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☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

44,586.—Ball Screw for Fire-arms.—John J. Aliscs, Washington, D. C.:

I claim the nippers, A A, and gouges, B B, in combination with the horns, C C, substantially as and for the purpose set forth.

44,587.—Ejector for Oil Wells.—J. D. Angier & Frederick Crocker, Titusville, Pa.:

We claim the discharge pipe with its contraction and open lower end substantially as described, in combination with the blast pipe having its lower end turned up and provided with a nozzle, and inserted in the lower open end of the discharge pipe, and below the contraction thereof, substantially as and for the purpose specified.

44,588.—Fuse for Explosive Shells.—Clifford Arick, St. Clairsville, Ohio:

I claim, first, The formation of an annular fire-chamber within the radius of a Bormann or curved fuse, by combining a grooved head to its screw-pin or by combining the grooved head of a screw-plug with the inner wall of its soft metal case, substantially as described.

Second, A packing disk, for an annular fuse having on one side of it the necessary wedge or wedges for packing it, and on the other a magazine, as described.

Third, The combination of an annular fire-chamber, situated within the radius of a Bormann fuse with an independent primer, so that the flame generated by the primer is instantly injected into such fire-chamber, from whence escaping at the cut it will ignite the fuse, substantially as described.

Fourth, So combining with a soft metal fuse case, a fuse plug, or a concussion or percussion fuse case, as to securely hold the former in the projectile, by the combined action of the screw thread, and flanged head of the latter.

44,589.—Composition for Pavements, etc.—Richard Atkinson, Mount Vernon, N. Y.:

I claim combining broken stone gravel, boiling coal tar and hydraulic cement, in about the proportions specified to form a composition for the paving of highways, carriage ways and sidewalks.

44,590.—Wire Toaster or Broiler.—Samuel Ayres & Henry J. Chamberlin, Worcester, Mass.:

We claim the combination of the collars, bars, and frame, when constructed and operating in the manner and for the purposes above set forth.

44,591.—Method of repairing Casks and Barrels.—Charles A. Baldwin, Boston, Moss.:

I claim as a new article of manufacture the chine blank having a formation, substantially as described.

44,592.—Petroleum Lamp.—Wm. B. Billings, Brooklyn, N. Y.:

I claim the combination of all the parts of my burner, in the manner substantially as described and for the purposes represented and set forth.

44,593.—Water Elevator.—J. S. Brown, Washington, D. C.:

I claim the curved link, G, constructed and operating substantially as and for the purpose herein specified.

I also claim the chain, I, or its equivalent operating in combination with the curved link, G, or its equivalent, substantially as and for the purpose herein set forth.

44,594.—Device for transmitting Motion.—John W. Browning, Mattoon, Ill.:

I claim the combination of the cranks, C F, eccentric, D, shafts, B B', and fly-wheel, G, (one or more) constructed and operating in the manner and for the purpose set forth.

44,595.—Churn.—Ebenezer Buel, Sheridan, N. Y.:

I claim, first, In combination with the brackets, F, a rectangular shaped churn with a hollow journal, for the purpose of admitting air into the cavity of the churn, the churn having an inclination upon its axis, the several parts being constructed, arranged and operating as specified.

Second, I also claim in combination with the churn, A, and the frame, B, the brackets, F F, when constructed and used for the purposes set forth.

41,596.—Faucet.—G. F. Burkhardt, Roxbury, Mass.:

I claim the sleever, B, with handle, C, fitting loosely into the tubular socket, A, and operating in combination with the same and with the tube, D, or its equivalent and plug, E, substantially in the manner and for the purpose herein shown and described.

The object of this invention is a faucet which can be fastened to or unfastened from the head of a barrel or cask without straining said head by blows and which will be closed, while the faucet is removed so as to prevent the cask or barrel from getting musty.]

44,597.—Steam Generator.—George B. Brayton, Providence, R. I.:

I claim in an apparatus in which steam is generated in tubes having a constant supply of water in combination with said tubes the surrounding of the same with tubes capable of being highly heated so that complete combustion of the gases emanating from the fuel, and while in contact therewith may be effected while its temperature is transmitted to the steam generating tubes, as herein set forth.

44,598.—Steam Generator.—George B. Brayton, Providence, R. I.:

I claim the use of plates in the furnace of a steam generating apparatus, substantially as and for the purpose specified.

44,599.—Steam Generator.—George B. Brayton, Providence, R. I.:

In combination with a steam generator I claim the employment of a vessel substantially as described operating as a steam drum and feed water reservoir, substantially as shown and described.

In combination with the above I claim forming an exhaust steam chamber under the body of the feed-water so that it shall be heated both from above and from below, substantially as set forth.

44,600.—Steam Generator.—George B. Brayton, Providence, R. I.:

In a tubular steam generator substantially as described I claim controlling the supply of water and regulating its action by combining by means of a contracted tube the said generator with a reservoir the water in both being under like pressure, substantially as described.

41,601.—Steam Generator.—George B. Brayton, Providence. R. I.:

I claim the combination of a tubular steam generator with a water reservoir under the arrangement described so that the water shall be maintained therein at a temperature less than 212° Fah., and be entered the generator by tending to equilibrate hydrostatic pressure between the generator and the reservoir, substantially as set forth.

44,602.—Curtain or Shade Fixture.—Wm. Campbell, New York City:

I claim the wedge, E, and pulley, D, in combination with the spring roller, A, all arranged substantially as and for the purpose herein set forth.

[This invention relates to a new and useful improvement in that class of fixtures for window shades in which the roller on which the shade is wound is provided with a spiral spring to render the roller self-acting in winding up the shade. This invention consists in a new and improved stop mechanism for holding the roller or preventing it from winding up the shade so that the latter may be held or retained at any desired hight.]

44,603.—Horse Shoe.—Morgan Chittenden, Danbury, Conn.:

I claim as a new improved article of manufacture an animal shoe, the upper, a, band, e, sole, b, substantially as and for the purpose as described.

44,604.—Loom Shuttle.—Thomas Clark, Ware, Mass.:

I claim the weight resting upon the filling yarn within the shuttle, constructed as herein described and for the purpose specified.

44,605.—Finishing Eaves Trough.—C. A. Codding, Battle Creek, Mich. Ante-dated Sept. 30, 1864:

I claim the combination with the bed or platform, A, and concaves, B and C, of the adjustably pivoted levers, D, and hooks, E, the whole being constructed and arranged in the manner and for the purpose herein set forth.

44,606.—Saw Mill.—Wm. S. Colwell, Pittsburg, Pa., and Utilles Baird, Alleghany, Pa.:

We claim, first, The arrangement of the cone pulley, 10, endless screw, l, wheels 1 6 1 2 3 4 5 and 6, leaders, 7 and 8, rollers, f and f', constructed, arranged, operating substantially as herein described and for the purpose set forth.

Second, The arrangement of the screw, s, swivel nut, y, disk, r, spring, t, strip, g, screw, v, and spring, u, when used in connection with the rollers, f and f', as herein described and for the purpose set forth.

44,607.—Watch.—Simeon Coon, Havre de Grace, Md.:

I claim, first, Placing the barrel wheel, A, on the center of the main watch-plate, G, and turning the barrel wheel to wind up the watch by means of the hinged stationary winder, B, as herein described.

Second, I also claim the flanged rim, E, for securing the barrel wheel, A, to the main plate, G, as described.

Third, I also claim attaching the main spring, I, to the center wheel, J, the outer end attached to the rim of the barrel wheel, A.

Fourth, I also claim the arrangement and combination of the barrel wheel, A, hinged winder, B, flanged rim, E, and center wheels, J and C, for winding a watch and setting the hands at the center of a watch.

44,608.—Hinge.—Joseph V. C. Crate, Waterbury, Conn.:

I claim a stop composed of a separate metal plate bent or curved, and inserted into space between the two eyes of the hinge and between the pintle and the inner edges of the leaves which abuts against said stop, and all constructed and arranged in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and improved butt hinge and it consists in providing the hinge with a stop arranged in such a manner as not to augment the cost of construction over the ordinary butt hinge, and still be equally as strong and durable as the ordinary butt hinges without stops.]

44,609.—Sawing Machine.—Jonathan Creager, Cincinnati, Ohio:

I claim, first, The rests, I, attached at their lower ends to the back of the feeding-table, G, and passing up in rear of the saw, the same being constructed and operating as set forth.

Second, The provision in rear of a circular saw, of the inclined gravitating apron or flap, M, whose lower edge is connected by means of a hinge, m, to the chute, D, and whose upper edge is supported in near proximity to without touching the saw blade, substantially as set forth.

44,610.—Lifting Pump.—Frederick Crocker, Titusville, Pa.:

I claim combining with a piston of a lifting pump a sustaining valve, when such valve is placed above, concentric and free to play on the rod of the piston and has its seat in the barrel of the pump, substantially as and for the purpose specified.

44,611.—Weighing Apparatus.—Samuel Darling, Bangor, Maine:

I claim the improved scale beam as made with a series of separate fulcra and scales of divisions arranged therewith, and to be used with one or more movable weights, and a hod or its equivalent, substantially as explained.

I also claim the movable beam weight as made with the index arm and so as to straddle and be capable of sliding on the beam, as specified.

And with the scale beam as made with a series of separate fulcra and scales of divisions as described, I claim the construction of the saddle box, x, with the two notches, X X, the same be used in manner and for the purpose as specified.

44,612.—Cooking and Heating Stove.—Henry Decker, of Duncansville, Pa.:

First, I claim the combustion chamber, 6' 6', formed in front of the fire chamber by the continuation and conjunction of the vertical flues, 4 and 5, with the flue, 6, so as to expose the smoke and gases to an intense heat, and thereby cause them to be consumed before they escape from the stove, substantially as described.

Second, The metallic caps, 11 and 12, in the front wall of the fire chamber, constructed and applied substantially as and for the purpose described.

Third, The combination of the lime drawers, 3 and 8, or either of them, with the flues of a heating or cooking stove, substantially as described.

[This invention is designed for stoves wherein bituminous coal is burned, although it may also be fitted for other fuel. One of the objects of the invention is the consumption of the smoke, and another is the absorption of the carbonic acid gas evolved by the combustion of the fuel.]

44,613.—Weather Strips.—Abraham Dodder, of Washington, Iowa:

I claim the hinged or pivoted plate upon the door strip or bed of the frame of the door, in combination with the plates or strips attached to the door, the parts being constructed and arranged in relation to each other and operated as herein set forth.

44,614.—Churns.—Harrison Doolittle, of Aurora, Ind.:

First, I claim the arrangement of horizontal dash, B C b b', driving arbor, D d, flaring undercut and grooved recess, a J', and tapering dovetail key, E, the whole being arranged and operating substantially as set forth

Second, The arrangement of the removable horizontal brake, L l, cavity, M, ledge, N, and pin, O, as described.

44,615.—Folding Paper Collars.—Merriman P. Dorsch, of New York City:

I claim preparing paper collars for making the fold in a curved line, by subjecting the paper, while resting on a table or equivalent surface, to the action of a creasing wheel on a radial vibrating arm, substantially as described.

And I also claim completing the fold of paper collars which are folded in a curved line, by drawing them between two rollers which are free to turn on independent studs, when one of the said rollers is shorter than the width of the outer or folded part, substantially as described.

44,616.—Leather-pressing Machine.—Gerhard F. Dresing, of Buffalo, N. Y.:

I claim the iron frame, A, having journal boxes formed in the top thereof, for the support of the upper roller, and slots, g, for grinding the lower roller, and forked fulcrum lever, D, in combination with the convex and concave rollers, B C, pedal, E, and connecting rod, F, for the purposes and substantially as set forth.

44,617.—Camp Stove.—Jacob Dunton, of Philadelphia, Pa.:

I claim the hood or casing, B, employed in connection with the boiler, A, to adapt the same to be heated by a fire built upon the ground, and to protect the fire in the manner and for the purposes explained.

44,618.—Machine for Shearing Sheep.—Wm. M. Eccles, of Oberlin, Ohio:

I claim the combination of the cam wheel, the ratchet, the pulley, the cutters and spring as above described and for the purpose set forth.

44,619.—Apparatus for Evaporating Saccharine Liquids.—George E. Evans, of Boston, Mass.:

I claim, first, The combination of the perforated pipes or their equivalents for conveying steam equally to all parts of the heating chamber with a separate vessel or steam trap, so arranged and operating as to prevent the presence of water in the said heating chamber.

Second, In combination with rotating disks or plates a revolving pan or pans, operating substantially as described.

44,620.—Reefing and Furling Sails.—George H. Felt, of New York City. Ante-dated Sept. 25, 1864:

I claim the combination of ropes in form and manner of lacings, for the purpose of reefing and furling sails, the said lacings remaining stationary and the sail being reefed by the yard being lowered, all arranged and combined as specified.

44,621.—Anchor Clutch.—Henry Fleming, of Chicago, Ill.:

I claim the bed piece, A, the slide, B, and the prongs, D, when arranged and operating substantially as and for the purpose set forth.

44,622.—Furnace-grate Bar.—Henry Gerner, of New York City:

I claim, first, The groove, a, extending in a longitudinal direction, throughout the upper edge of the grate bar, A, in combination with the transverse holes, b, constructed and operating substantially as; and for the purpose set forth.

Second, In combination with the aforesaid groove, a, and holes, b b, I claim the diamond-shaped corrugated projections. c c, constructed and operating as specified.

[This invention consists in the arrangement of a groove, extending in a longitudinal direction through the entire upper edge of a grate bar, which is provided with holes passing transversely through the same near its upper grooved edge in such a manner that by the ashes accumulating in said groove, and by the current of air passing through the transverse holes and through the ashes in the groove, the upper edge of the grate bar is kept comparatively cool, and the burning out of the same is obviated or prevented.]

44,623.—Machines for Making Bolts.—Moore Hardaway, of St. Louis, Mo.:

I claim the combination of the die box, b, header, k, and clamp dies, d d', in a bolt or rivet-heading machine, when operating in the manner and for the purpose herein set forth.

44,624.—Curtain Fixture.—Stewart Hartshorn, of New York City:

I claim a pawl, E, attached to the bracket or other fixture, near a shade roller, to engage with a notched hub, E, attached to one end of said roller, when said parts are used in connection or combination with a spiral spring, C, placed within the shade roller, and all arranged to operate substantially as and for the purpose herein set forth.

44,625.—Grain Screen.—James Hatfield and John Wall, of Ogden, Ind.:

We claim the hopper, H, and reel, B, when constructed and arranged substantially as shown and described, and operating in the manner and for the purposes set forth.

44,626.—Bucket for Preserving Butter, Fruit, etc.—E. G. Hofman, of St. Louis, Mo.:

I claim the bucket, A B c f d, constructed substantially as herein described, and represented as a new article of manufacture and trade, for the purposes set forth.

44,627.—Pumps.—Benjamin J. C. Howe, of Syracuse, N. Y.:

I claim the construction and operation of the valve, c, within a hollow piston, as shown and described.

I also claim the extension of the valve, d, in combination with the piston, b b, and valve, c, substantially as shown and described.

44,628.—Mowing Machines.—M. G. Hubbard, of Syracuse. N. Y.:

I claim the curve, D, in the corner plate, substantially as and for the purpose set forth.

44,629.—Mowing Machines.—M. G. Hubbard, of Syracuse, N. Y.:

I claim the manner of conducting and strengthening the cutter bar, substantially as and for the purpose set forth.

44,630.—Percussion Locks for Discharging Mining Blasts.—E. Hughes, of McCartysville, Cal. Antedated Oct. 4, 1864:

First, I claim the barrel, A, provided with a hammer, D, tip, B, nipple, C, trigger, G, and dog, H, all constructed and operating substantially as herein shown and described.

Second, The combination of the trigger, G, catch, F, and hammer, D, with the prop, I, dog, H, and cord, J', substantially as and for the purpose set forth.

44,631.—Submarine Shot Conductor.—E. H. Hull, of Millersburgh, Ohio:

I claim the tube, and valve, G, together with the metallic lining, F F F, when arranged and operating in the manner and for the purpose described.

44,632.—Slide Valves for Steam Engines.—William Huston, of Wilmington, Del.:

I claim a valve, D, with channel d, and apertures, e e' f, arranged in combination with the seat, A, and ports, a a' b b' c, substantially as and for the purpose set forth.

Also, the exhaust, c, applied in combination with condenser exhausts, b b', and valve, D, or its equivalent, in the manner and for the purpose substantially as described.

[This invention consists in a valve with a double exhaust—one into the chimney or open atmosphere and the other into a condenser, in such a manner that through the first or ordinary exhaust the pressure of the steam in the exhaust-end of the cylinder is reduced to that of the ordinary atmosphere, or nearly so, and the condensation of the remaining steam can be effected in the same manner and by the same means as by a common low-pressure-condensing engine.]

44,633.—Machines for Cutting Files.—James Jervis, of Baltimore, Md.:

I claim, first, The combination of the regulator, Y, with the movable conical cam, whereby the thickness of the shape is made to regulate the force of the blow of the chisel.

Second, The combination of the regulator aforesaid with the levers, through the action of which as described in the specification the thickness of the shape is made to impart a lateral movement to the conical cam.

Third, The arrangement of the devices, whereby the shape is kept upon the anvil, as described, and the regulator is made to impart a longitudinal rocking motion to the shape, and is moved forward under the chisel, so as to secure a perfect resistance to the blow of the latter, notwithstanding the shape and the flatness of the anvil.

Fourth, The combination of the saddle-shaped anvil proper, permitting the screw moving it to be placed beneath it with the rest on which it slides another clasp, f f, on the endless screw, T.

Fifth, The combination of the endless screw on bolt, g, Fig. 4, and cogwheel, f, with the regulator, whereby the parallelism of the latter with the edge of the chisel may at all times be secured.

Sixth, I also claim the combination of the chisel with the adjustable block, D, arranged as described, whereby the tooth of the file may be cut sharper or blunter, as required.

Seventh, I also claim the arrangement of the chisel frame with the

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anvil frame, in the manner herein described, by which their distance from each other may be varied as described

44,634.—Working Oyster Tongs.—George Jury, of Baltimore, Md.:

I claim the method above described of combining a common strong barrel as an elevator, with cords and blocks to several pair of rakes, operating and geared as above described, for the purpose of raking oysters with but few hands.

44,635.—Distributing Fertilizers.—Horace M. Keith, of Pontiac, Mich.:

I claim the cylinder, A, the forked rod, B, the bands, e, and bands, d, the whole arranged, constructed and operating substantially as herein set forth.

44,636.—Rubbing Seams of Boots and Shoes.—William H. Kimball, of Lynn, Mass.:

I claim the combination of the convex and grooved rolls, when arranged substantially as described, for the purpose of rubbing or pressing down the seams at the heel end and front of a closed boot or shoe upper before the same is bottomed.

I also claim the combination of the cylindrical roller, r, with the hollow open roll, s, in the manner and for the purpose substantially as described.

I also claim the arrangement of the lower roll upon the top of a post (or any arm projecting therefrom) to allow said roll to extend into the inside of the upper, substantially as set forth.

44,637.—Nail Machines.—Jacob B. Kingham, of East Bridgewater, Mass.:

I claim the combination of the stationary cutter and gripper, I, the movable cutter and gripper, G, the movable cutter, H, the two movable grippers, K N, and the header, R, arranged as set forth, and provided with mechanism for operating them, substantially as specified.

And I also claim the combination of the same and the steadying strut, W, the object of the latter being as hereinbefore explained.

44,638.—Artificial Arms.—John H. Koeller, of New York City:

First, I claim the method or mode of constructing the artificial shoulder joint by means of the collar, A, the ring, B B, and the hoop, D D, sliding or moving on the same, by means of the brackets, E E, together with the hinge motion of the shell, F, of the upper arm, effected by the movement of the stump, and by means of pivots, G G, as hereinbefore set forth and described.

Second, I claim the arrangement and mode of constructing the artificial elbow joint and the following-enumerated parts for effecting the flexion and extension of the forearm, and the alternating right-lined motion of the slide, T, for the flexion and extension of the thumb and fingers, to wit: the bracket, N, the curved hinge link, Q, the rod, R, the link, S, with its hinge, P, the segment of cogweeel, H, the pinion wheel, L, the brace, W, the connecting rods, U U, and the slide, T, as hereinbefore fully specified and described.

44,639.—Washing Machine.—C. W. Theo. Krausch, of St. Louis, Mo.:

I claim, first, A machine provided with a horizontal rotating shaft, F, having stirring wings on it, operating substantially as described.

Second, The bracket support, E, for the shaft, F, in combination with a vertical turning shaft, C, substantially as described.

Third, The combination of a horizontal shaft, F, for the stirrers, a vertical shaft, C, circular rack, a, a bracket, E, and pinion spur wheel, g, arranged and operating substantially as described.

Fourth, The construction of the stirring wings, h, with teeth or other equivalent projection, substantially as set forth.

Fifth, The use of spiral stirrers, applied to a horizontal shaft, F, working within the tun, substantially as described.

Sixth, Elevating, and at the same time giving a lateral motion to the matt during the washing process, by means substantially as herein described.

44,640.—Apparatus for Bending and Folding Paper Collars.—Wm. E. Lockwood, of Philadelphia, Pa.:

I claim, first, The use of two rollers, one having a concave and the other a convex surface, in combination with a reciprocating plate, c, of a form corresponding with that of the rollers, substantially as and for the purpose herein set forth.

Second, Cutting away the circumference of one or both of the rollers at one point, in the manner and for the purpose described.

44,641.—Marine Propeller.—Thomas Mason, Boston, Mass.:

I claim the combination of the feathering paddle blades, a, and sprocket chains, b, when the links of the chains (and the blades attached thereto) are so arranged as to have a horizontal movement between the sprocket wheels, c c, substantially as and for the purpose set forth.

44,642.—Horse-collar Block.—B. W. McClure, Wyoming, Iowa:

I claim, first, The crossing of the hame cord, H, with its ends attached to an adjustable bar, I, when said cord is used in connection with the mold-block, B, and rim-setter, C, substantially as and for the purpose herein set forth.

Second, The attaching of the rim-setter, C, to an elastic bar, E, by means of a hinge or joint, D, to admit of the ready manipulation of the rim-setter, as described.

Third, The bar, e, provided with a plurality of legs, f, at each side, when used in combination with the rim-setter, C, and mold-block, B, for the purpose specified.

Fourth, The enlarged stretcher, L, in combination with the mold-block, B, and rim-setter, C, all arranged substantially as and for the purpose set forth.

[This invention relates to certain improvements in a horse-collar block, which was patented Aug. 24th, 1858. The within described invention consists in an improved arrangement of what is technically termed the "hame cord," by which the groove in the collar to receive the hames is made in a more perfect manner than hitherto. The invention also relates to an improvement in the "rim-setter," and certain parts pertaining thereto, whereby the manipulation of the same is greatly facilitated. The invention further relates to an improvement in the "stretcher," for varying the size of the collar on the block.]

44,643. Ambulance.—Edwin R. McKean, Washington, D. C.:

I claim, first, The false bottom, B, constructed substantially as described, and supported upon the rubber springs, a, or their equivalents.

Second, I claim the roller, F, arranged to operate as described, whether the same may be attached to the false bottom, B, or to the bottom of the body, A.

Third, I claim the stretcher, D, provided with the roller, E, and hook, c, or its equivalent, when constructed and operating as and for the purpose herein set forth.

Fourth, I claim providing an ambulance with a water vessel, having tubes so arranged that the occupants can supply themselves at pleasure.

Fifth, I claim arranging a fan in connection with an ambulance in such a manner as to supply a current of air to the occupant.

Sixth, I also claim constructing the sides of the body of an ambulance with vertical slats having beveled edges, so that when said slats are closed they shall present a plane surface, both externally and internally, as shown and described.

44,644.—Artificial Leg.—Joshua Monroe, New York City:

I claim the employment or use of raw hide in the manufacture of artificial limbs, substantially in the manner herein specified.

[This invention consists in the employment or use of raw hide for the manufacture of artificial limbs, in such a manner that a light, strong, and durable limb can be produced, which can be readily lengthened or shortened to suit patients of different stature, and which can be fastened to a stump with ease and facility.]

44,645.—Soda Water Apparatus.—Andrew J. Morse, Melrose, Mass.:

I claim in connection with one or more sirup vessels or jars, the indicating tubes, arranged and operating substantially as described.

I also claim in combination with the sirup vessels and indicators, the charging cups, g, arranged upon the top of the box and leading into the sirup vessels, as and for the purpose set forth.

And with an apparatus constructed with the charging cups and indicators, I claim the construction of the top of the top of the box, with the fixed part, f, and hinged cover, i.

44,646.—Ejector for Oil Wells.—George M. Mowbray, Titusville, Pa.:

I claim, first, The ejector composed of a pipe closed at the bottom and perforated at the sides, in combination with the conical cup, D, constructed and applied substantially as and for the purpose described.

Second, The upper tube, e, or its equivalent, for the purpose of increasing or diminishing the annular space, b, at the upper edge of the ejector, substantially as described.

44,647.—Saw-filing Machine.—S. P. Ochiltree, W. S. Weir, Jr., and A. P. Baymount, Monmouth, Ill.:

We claim, first, The adjustable guide, O, in connection with the slide, M, crank, F, and pitman, N, for giving motion and a proper direction to the file, T, substantially as and for the purpose set forth.

Second, The slide, W, provided with the pin, c, in combination with the pin, a*, of wheel, K, for the purpose of raising the file during the feed movement of the saw, as set forth.

[This invention relates to a new and improved machine for filing saws, whereby the work may be done in a very accurate manner by simply turning the driving shaft of the machine, all the parts operating automatically and in a perfect and efficient manner.]

44,648.—Apparatus for washing and drying Photographs.—Adalbert Paersch, New Orleans, La.:

I claim, first, The washing, etc,, between separate layers of textile material.

Second, I claim the combination of the whole apparatus as set forth in the specification and drawing, washing, centrifugal washing, and drying wheel for photographic prints, and other textile or fibrous articles, and for washing clothes, etc.

44,649.—Bellows Pump.—Ezra Parker, Beverly, Ohio:

I claim the claim the combination and arrangement of the upper and lower plates, A, flat rings, B, air chamber, C, leather or gum disks, c2, discharge pipe, D, lever, E, small plates or valve seats, f, supply and exhaust valves, b', the whole arranged substantially as specified for the purpose set forth.

44,650.—Feed-cutter.—J. J. Parker, Marietta, Ohio:

I claim, first, Suspending the box, G, on the shaft, G. in combination with the rake head, M, or its equivalent, in the manner and for the purpose set forth.

Second, I claim also the V-iron, when combined and connected substantially in manner described.

44,651.—Cider Mill.—H. K. Parsons, Harrisburg, Pa.:

I claim, first, The concave, C, in combination with the adjustable breast-board, D, constructed and operating as shown.

Second, I claim the elongated yoke, c, in combination with the concaves, C, and adjustable breast-board, D, when constructed and arranged to operate as and for the purpose herein set forth.

44,652.—Pitchfork.—Isaac D. Peck, South Bristol, N. Y.:

I claim securing the tapering shanks of the tines of a fork into a correspondingly tapered recess formed in a socket piece, a, by means of wedges or keys inserted between the shanks, substantially as described.

44,653.—Wrench.—John W. Penney, Mechanic Falls, Maine:

I claim the sliding aw, C, provided with a tenon, a, which is fitted in a slot, b, in the shank, A, of the stationary jaw, B, in combination with the rack, f, on the back of the shank, A, the spring, D, fitted on the tenon, a. and secured to jaw, C, by a screw, d, and having a lip, e, to engage with rack, f, all being arranged substantially as and for the purpose set forth.

[This invention relates to a new and improved wrench of that class which is provided with an adjustable jaw, and it consists in an improved arrangement of the latter whereby the wrench may be readily adapted or applied to nuts of different sizes.]

44,654.—Horse-cover.—E. L. Perry, New York City:

I claim, first, A cover for horses and other animals, constructed so as to permit the circulation of air through the same, and between it and the body of the animal, substantially as and for the purpose above described.

Second, Making a ventilating cover for horses and other animals by means of louvers, B and D, or either of them, constructed and applied substantially as above described.

Third, Supporting the roof of the louver over the openings in the cover, and clear from the cover, by means of rivets and elastic or other rings fast on the rivet bodies, or of other fastenings or modes of attachment, substantially as described.

44,655.—Mowing Machine.—James Pine, Troy, N. Y.:

I claim, first, The movable or adjustable lever, L, arranged substantially as shown for raising the cutter bar.

Second, The brace, H, arranged and applied substantially as shown, to serve as an efficient brace or stay for the cutter-bar, and at the same time not interfere with the raising and lowering of the latter, as set forth.

Third, The draught lever, P, applied to the draught pole and bar, G, of the cutter-bar, M, to operate in the manner set forth.

Fourth, The track-clearer, S, applied to and made adjustable upon the outer end of the cutter-bar, M, by means substantially and for the purpose specified.

44,656.—Foot-rest for Blacking-boxes.—John H. Porter, New York City:

I claim the combination of the box, A, with the foot-rest, C, when the latter is attached to the former by means of a spring, B, to admit of the adjustment of the boot or shoe, while on the foot of the wearer, to the brush, substantially as and for the purpose set forth.

[This invention consists in combining a convenient and portable receptacle for a blacking-box and brush, with a foot-rest on which the boot or shoe is blacked and polished, all being arranged in such a manner as to afford a very desirable article for private use, one by which boots or shoes may be blacked by the wearer, while on his feet, with the greatest facility.]

44,657.—Skimmer for Sugar Evaporators.—Thomas J. Price, Industry, Ill.:

I claim, first, The rock shaft, J, and rods, O O, in combination with the skimmer frame, s, and skimmer, L, as shown and described for the purpose set forth.

Second, The arrangement of the sloping end, c, and gutter, i, in combination with the rock shaft, J, skimmer frame, s, and skimmer, L, substantially as and for the purpose set forth.

Third, The combined arrangement of the defecating apartment, R, the skimming apparatus and sloping end as shown and described, for the purpose specified.

44.658.—Cultivator and Seeder.—T. Louis Ray, Flora, Ill.:

I claim, first, The application to cultivators of the rudder, A, for the purpose of steering the machine, and raising the front end of the machine from the ground.

Second, I also claim the arrangement of the wheels, Q and H, as set forth and for the purpose specified.

44,659.—Furrowing Device.—W. S. Riggs, Hightstown, N. J.:

I claim the adjustable shares, E, when constructed with mold boards, c c, curved outward at the upper and rear ends of the shanks, a, which are secured in the rear ends of the runners, A A, by pins, b, to form a new and improved furrowing device, for the purpose specified.

[This invention relates to a new and improved device for furrowing land for planting corn and other seed which are planted in hills or drills. The invention consists in the employment or use of two shares constructed in such a manner as to form furrows without dragging or raking up weeds, trash, etc., said shares being attached to the runners in such a manner that they may be capable of being adjusted higher or lower, according to the depth of furrow required.]

44,660.—Primed Metallic Cartridge.—E. K. Root, Hartford, Conn.:

I claim the employment within the case of the cartridge of movable sections of solid material, having fulminate confined or arranged between their adjacent surfaces or edges, substantially as and for the purpose set forth.

44,661.—Nail Machine.—Marcus T. Rounds, Taunton, Mass.:

I claim, first, The movable back piece, t, on the heading side of the dies, operated by means of a cane or other suitable device, substantially in the manner and for the purpose set forth.

Second, I claim extending the nipper, L, beyond the heading side of the dies, to grasp the head of the blank between said nipper and the movable back piece, t, substantially as set forth.

Third, I claim the nipper, L, working on the heading side of the dies, in combination with the movable back piece, t, and the gage, c, arranged and operating substantially in the manner and for the purpose described.

44,662.—Machine for charging Fireworks.—Theodore Scharfenberg, Brooklyn, N. Y.:

I claim, first, Combining with a series of spindles, a a, arranged upon a bed plate, the guide plate, F, to insure a proper position of the tubes, b b, during the process of charging with composition, substantially as described and specified.

Second, Combining with a series of spindles, a a, tubes, b b, guide plate, F, and runners, c c, the weight or driver, J, arranged to drive the composition into the tubes, b b, substantially as described.

Third, The construction and arrangement of the hopper having double slides and provided with two sets of tubes, m and n, for charging the tubes of fireworks with composition, substantially as described and for the purpose set forth.

44,663.—Refrigerator.—Jacob F. Schneider, Brooklyn, N. Y.:

I claim the combination and arrangement of the cold water trough, air passages, and blower, when placed in the lower part of the refrigerator, so as to be supplied with the water from the ice tray above, substantially as described, for the purpose of changing the air in the lower part of the refrigerator without causing a current of air to come in contact with the ice above.

I claim also the arrangement and combination of the valve and and outlet passages above with the blower, cold water trough, and induction air passages below, substantially as described.

And finally I claim the arrangement of thick pasteboard, or layers of thick paper, with the walls of refrigerators, substantially as described.

44,664.—Preserving Fruit, etc.—Nathaniel S. Shaler, Newport, Ky.:

I claim the employment of carbonic acid gas, and a refrigerating temperature, together and relatively to such substance, substantially in manner as herein-before set forth.

I also claim the combination of a preserving chamber, a, a moisture refrigerating apparatus, and a means of circulating the carbonic acid gas of such chamber through or so in contact with the surfaces of the refrigerating apparatus as to not only cover the gas, but cause such mixture to be frozen or condensed and abstracted from the gas, substantially as specified.

I also claim the preservatory as constructed of one or more dumb waiters or elevators, D or the equivalent thereof, the gas chamber, A, the gas refrigerating apparatus, E, and the gas circulating apparatus, the whole being arranged and combined substantially as and so as to operate in manner and for the purpose as specified.

44,665.—Apparatus for throwing Horses.—Silvester Shaw, Russelville, Ohio:

I claim the combination of the strap, E, the rope, P, the straps, A and F, the spancel, B1 and B2, and the strap, C, the whole constructed and arranged for the purpose substantially as herein specified.

44,666.—Tag-holder for Bags, etc.—Richard Shepard, Brooklyn, N. Y. Ante-dated March 17, 1864:

I claim the blade, b, in combination with the thin slide, g i k, and the instrument, C, when operated as shown and described.

44,667.—Tree Protector.—Forrest Shepherd, New Haven, Conn.:

I claim, as a new article of manufacture, an apparatus made by attaching strips or plates of mica to a band, to be placed around the body of the tree, to prevent the ascent of grubs, worms, and other insects, when constructed and fitted to be attached, substantially as herein described.

44,668.—Spring for Carriages.—William Smith, Shrewsbury, Pa.:

I claim the frame composed of the longitudinal beams, A and A', and end beams, B and C, in combination with any desired number of slats, G H H and I, passing through the said end beams, having oblong slats for the reception of pins, e, and being connected together by any desired number of cross bars, J K L, all substantially as and for the purpose herein described.

44,669.—Packing Projectiles for Rifled Ordnance.—W. H. Smith, Birmingham, Conn.:

I claim the combination of the expansible packing band with the projectile, when constructed and arranged to operate in the manner substantially as described for the purpose set forth.

44,670.—Jacket for Sub-caliber Projectiles.—W. H. Smith, Birmingham, Conn.:

I claim making the metallic holder-case or centering jacket to fill the bore of the gun, at both its rear and forward ends, and its intermediate portion to fit to the bolt or body of the shot, substantially as and for the purposes set forth.

44,671.—Mode of securing Pure and Wholesome Air in Dwellings, etc.—Daniel E. Somes, Washington, D. C.:

I claim the manufacture of articles of household furniture with receptacles for containing charcoal, substantially as herein set forth and described.

I also claim the mode herein described of purifying the air in dwellings, halls, hospitals, and other places, by means of a charcoal receptacle, constructed substantially as herein specified.

44,672.—Mode of cooling the Air in Buildings.—Daniel E. Somes, Washington, D. C.:

I claim, first, Lowering the temperature in buildings or excavations in the earth, by rarefying the atmosphere of the same, in the manner and for the purpose set forth.

Second, Ventilating the interior of buildings or rooms, in the manner described.

44,673.—Hay Press.—Charles S. Stevens and Alonzo T. Boon, Galesburg, Ill.:

We claim, first, The combination of the endless carrier cloth, f, compression rollers, a' a', and band roller, a'', with the metallic knife edge plate, a, substantially in the manner and for the purpose herein set forth.

Second, We claim the swing lever, C', and slotted cane wheel, c, in combination with the toggle-jointed levers, C C, and follower, D, substantially in the manner and for the purpose herein set forth.

44,674.—Piston for Steam Engines.—Nathan P. Stevens, Boston, Mass.:

I claim the improved piston or piston head, as made with the vibratory ring and its groove, and the steam tight chamber opening into the said groove, the whole being in manner and so as to operate as described.

I also claim the combination of the annular projection, c, or its equivalent, with the vibratory ring and its groove, and the steam tight chamber and its opening.

44,675.—Mode of protecting and repairing Shingle Roofs.—Isaac Straub, Cincinnati, Ohio:

I claim the application of roofing cement on nicked shingles, substantially as above described, which makes a durable roof, and a complete protection against all weather, and nearly so against all outside fires.

44,676.—Attachment for Ladies' Shoes.—O. H. Taylor, San Francisco, Cal.:

I claim the elastic strap or band to be attached to and passed around the upper part of the shoe or gaiter provided with a suitable buckle, and adapted to fit over a stud, L, all as herein described and for the purposes set forth.

44,677.—Washboard.—O. H. Taylor, of San Francisco, Cal.:

I claim, as a new article of manufacture, a separate and complete hand washboard, constructed with a rubbing surface of corrugated zinc, straight at its upper end and concave at the lower end, all as herein represented and described, and for the purposes specified.

44,678.—Apparatus for Drying Photographic Plates.—Julius Thompson, of Taunton, Mass.:

I claim the chimney or flue, A B, with one or more plain surfaces, as described above, and for the purpose specified.

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44,679.—Harvesters.—Julius Thompson, of New York City:

First, I claim a main frame of a harvesting machine, constructed with a tubular socket for the axle of the running wheels, in such a manner that the said socket performs the double function of sustaining the said axle and of stiffening the frame transversely, substantially as set forth.

Second, I also claim a main frame of a harvesting machine, constructed with a socket for the tongue, in such manner that the said tongue socket performs the double function of sustaining the tongue upon all of its sides and stiffening the frame longitudinally, substantially as set forth.

Third, I also claim the combination of the cog wheels of a harvesting machine, with still or silent shafts, which are rigidly secured to the frame of the machine, substantially as set forth.

Fourth, I also claim the combination of two of the cogwheels that impart motion to the cutter with each other by means of a saw-toothed spring clutch, so that the cogwheel nearer the cutter remains stationary when the machine is backed, and that the clutch may be operated by a lever to stop the cutter, substantially as set forth.

Fifth, I also claim the combination of the finger beam with the main frame by means of lugs and one of the shafts of the cutter gear, in such manner that the said shaft performs the double function of pinion, shaft and joint pin for the hinge joint, substantially as set forth.

Sixth, I also claim the mechanism for raising and lowering the cutter bar, consisting substantially of a winch, vibrating lever and saw-toothed clutch, combined together and operating substantially as set forth.

Seventh, I also claim the combination of the bevelled wheels together, by means of flanges which engage with each other and prevent the separation of the teeth of the wheels by movement in the direction of the axis of the wheels, substantially as set forth.

Eighth, I also claim the combination of the driving pulley of the reel with the grain wheel, by means of a spring clutch, in such manner that the revolution of the reel stops whenever the said grain wheel runs backward, substantially as set forth.

Ninth, I also claim the combination of a hollow reel shaft with a rod that connects the upper ends of the reel standards, so that the reel turns upon the said rod.

44,680.—Apparatus for Handling Vicious Horses.—Owen Turner, of Clinton, Wis.:

I claim, first, A harness adapted for correcting vicious habits in animals, which consists of a fetlock strap, a, controlling rein, A, fetlock strap, d, and girth, B, applied and operating substantially as described.

Second, The elastic-supporting strap, C, in combination with the controlling strap, A, when the latter is arranged substantially as and for the purpose described.

Third, The combination of the controlling rein, A, fetlock straps, a and d, and looped girth, B, with a supporting strap, C, substantially as and for the purposes described.

Fourth, The construction of the fetlock strap, a, for the front foot, with a pulley, b', applied to it in such a manner as to allow the controlling straps to slip freely through it in managing the horse, substantially as described.

44,681.—Mechanical Movements.—Maximilian Wappich, of Sacramento, Cal.:

I claim, first, A spiral thread, partaking closely of the character of a compound wedge, but in form lenticular, substantially as and for the purpose herein described.

Second, In combination with a pin wheel a spiral lenticular thread which will practically operate upon two or more of the pins of said wheel at the same time, substantially as set forth.

44,682.—Horse-hay Forks.—J. L. Wells, of Stockbridge, New York.

I claim, first, The curved or concave cast-iron head, A, provided with the arms, B B, to operate in connection with the catches, G G, and beam, C, substantially as and for the purpose set forth.

Second, Attaching the tines, F, to the head, A, by means of the bolts, e, and notches, f, as described.

Third, The straps, L L, attached to the beam, C, as shown, when used in combination with the arms, B B, and beam, C, substantially as and for the purpose set forth.

[This invention relates to a new and improved mode of constructing the fork generally, whereby great strength may be obtained, the load readily discharged, and device rendered capable of being easily managed by the operator.

44,683.—Apparatus for Preserving Provisions.—Charles Winship, of New Haven, Conn.:

I claim conducting cooled air to and causing the same to circulate through a chamber, substantially as specified.

44,684.—Method of Stopping Bottles.—Albert Albertson, (assignor to J. N. McIntyre) of New York City:

I claim, first, The employment in combination with a bottle having the interior of its neck suitably formed to receive it of a stopper constructed to operate in closing and unclosing the bottle, substantially as described.

Second, I claim so constructing the valve, c, and the mouth of the bottle that the former may be readily forced through the latter in one direction, and incapable of easy passage through it in the opposite direction, as hereinbefore described, for the purpose set forth.

Third, I claim making the entire stopper of such a length that it cannot turn over in the body of the bottle, as and for the purpose set forth

44,685.—Apparatus for Filling Bottles.—Albert Albertson, (assignor to J. N. McIntire) of New York City:

I claim filling and closing the filled or supplied bottles substantially as set forth, by the gravitation of the stopper.

44,686.—Running Stitch Sewing Machines.—John D. Dale, (assignor to himself and A. M. Badger) of New York City:

I claim, first The combination of the clamping levers, E and D, with the rolling needle stop, A A', operating substantially in the manner and for the purpose set forth.

Second, I claim the relief tooth wheel, in combination with yielding feed rollers, B B, and reciprocating cloth guide, C, substantially in the manner and for the purpose set forth.

Third, I claim the manner described, or its equivalent, for clamping and holding a common sewing needle firm enough to prevent its slipping while the cloth is being pulled off.

44,687.—Apparatus for Cutting and Creasing Paper for Envelopes, etc.—Martial Dimock, of Newark, N. J., assignor to Fitch, Estee & Co., of New York City:

I claim the countersink, G, Fig. 4, with elastic bed, and the die, F, Fig. 3, with projecting blades, H, to indent or partially sever the paper or other material used (for the purpose of facilitating the folding thereof), constructed and operated substantially as and for the purpose set forth.

44,688.—Machine for Paring the Edging of Boots and Shoes.—Horatio Hodges, (assignor to himself and David Waldy) of Lynn, Mass.:

I claim the rotary or sole edge cutter or combination of the cannular bur and the guard or guide, arranged together and on a shaft, as pecified.

I also claim the combination of the tubular split, tapering shank and its screw and nuts, with the bur and the guide or guard, the whole being arranged together substantially as specified.

44,689.—Caster for Trunks.—Henry T. Lee, (assignor to himself and David Frost) of Jersey City, N. J.:

I claim the flanged rocket, D, in combination with the caster, E, spring, C, and cap, A, constructed and operating in the manner and for the purpose substantially as set forth.

[This invention consists in a yielding spring caster, applied in combination with a cap, forming a cavity to receive the spring and shank of the caster, in such a manner that by the cap the cover of the trunk or other article to which it may be attached is prevented from uplifting, and at the same time the cap forms a guide for the shank of the caster, and prevents the same being exposed to a lateral strain.]

44,690.—Machines for Making Boxes.—Thomas C. Luther, of Lee, Mass., assignor to the American Flask and Cap Company, of Waterbury, Conn.:

I claim the stationary rollers, G G, in connection with the movable or adjustable roller, I, and belt, J, all arranged to operate substantially as and for the purpose herein set forth.

I further claim the box, D, and roller, E, in connection with the drum, C, and the rollers, I G G, all arranged to operate substantially as and for the purpose herein set forth.

[This invention is more especially designed for putting the covering on external paper band or cylindrical paper boxes, for the purpose of securing the top and bottom to the body of the box. It may, however, be used for covering wooden or sheet-metal cylindrical boxes.]

44,691.—Pegging Machine.—Joseph F. Sargent, (assignor to Elmer Townshend) of Boston, Mass.:

I claim in a pegging machine the employment of a jack, so constructed or mounted that it can turn or be turned latteraly, to hold the shoe properly to the action of the awl, throughout its varying lateral curvature.

I also claim so organizing the jack with the levers or system of levers supporting it that the jack is turned automatically, to bring the shoe laterally into position for the proper insertion of the awl and peg.

I also claim operating the swing piece by the eccentric, to produce the feed and transfer of contact, substantially as set forth.

Also the combination of the eccentric for operating the swing piece with the cam and spring for operating the driver bar.

I also claim giving the swing piece, k, a simultaneous lateral and vertical motion, substantially as and for the purpose set forth.

I also claim the employment of the swinging brake, e2, operating upon the wheel, c2, substantially as specified.

I also claim so constructing and applying the feed-foot, as to operate in the same vertical plane with the retainer (instead of through a slot in the same), in the manner and for the purpose substantially as set forth.

I also claim the construction by which the blow of the awl and peg driver bar is arrested at the bottom of the swing plate, substantially as described.

And in combination with an awl bar (or an awl and peg driver bar, having its downward movement imparted by a spring), I claim the method of regulating the force of the blow given to the bar by an adjusting screw, o2, substantially as shown and described.

44,692.—Priming Cartridges.—Charles Edward Sneider (assignor to himself and Thomas Poultney), Baltimore, Md.:

I claim, first, In combination with a cartridge which is exploded by an end blow upon a pin reaching the fulminate or cap on the base of the ball, making the cartridge case extend out as far as the point of the ball, so as to abut against the rear end of the barrel and prevent the forward motion of the ball or its protrusion into the bore previous to firing.

Second, I claim the combination of the recessed end of the cartridge case and the central cartridge pin, which form a gas-tight joint by the contraction of the rear of the case around the pin, under the force of the discharge.

44,693.—Buckle for Harness Tugs.—Richard Tattershall (assignor to himself and A. J. Battin), Belvit, Wis.:

I claim the frame, A, provided or cast with the plates, c c d, in combination with the clamp, B, fitted in the frame, A, as shown, and the lever plate, C, provided with the eccentric projection, D, fitted to the bar, e, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved buckle for harness tugs, wherein the use of a tongue is dispensed with and consequently the perforating of the trace.]

44,694.—Car Truck.—Charles D. Tisdale, East Boston, Mass., assignor to himself and Joseph H. Clapp, Boston, Mass.:

I claim the new or improved wheel locking mechanism, or combination consisting of the double-catch, D, the elastic band, E, and either one or two grooves, c d, and applied to the wheel sleeve and axle, and so as to operate therewith substantially as herein specified

44,695.—Cigars.—S. Davis, Montreal, Canada:

I claim as a new article of manufacture a medicated segar composed of tobacco leaves mixed with the leaves of belladonna, in the manner and proportions herein specified.

[This invention consists of segars made of a composition of tobacco leaves mixed with a small quantity of the leaves of belladonna, digitalis, or other similar medical plants, in such a manner that the specifics contained in said plants are introduced into the system of the human body together with the tobacco smoke in a finely divided state, and thereby the healing qualities of said plants are enabled to exert a much more powerful effect than they can when introduced into the system in the ordinary manner.]

44,696.—Propeller and Steering Apps.—Henry Ressel, Vienna, Austria:

I claim, first, The studs, f, and segmental grooves, e, applied in combination with the socket, c, and globe, d, and with the shafts, C and F, in the manner and for the purpose substantially as set forth.

Second, The use of the cap, h, in combination with the ball and socket joint, G, and shafts, C and F, applied and operating substantially as and for the purpose described.

Third, The grooves, i, and rings, j, applied in combination with the ball and socket-joint, G, propeller screw, A, shafts, C and F, and frame, B, in the manner and for the purpose substantially as set forth.

44,697.—Ventilating Sweat Leather for Hats and Caps.—A. H. Taylor, San Francisco, Cal.:

I claim, first, The application to a hat or cap of a corrugated sweat lining, said corrugations running diagonally with the plane of the under side or rim as shown in the drawings, the corrugations running around the inside of the hat or cap with the exception of a portion in front, which is smooth to fit the forehead.

Second, I claim the smooth part of the lining in front in combination with the diagonal corrugation, as described.

Third, I claim corrugating a sweat lining, in the manner shown and specified (as occupying the complete inner circle of the hat or cap, with the exception of the portion in front, which is made smooth to fit the forehead of the wearer), substantially as shown and set forth herein.

RE-ISSUES

1,790.—Horse-shoe.—O. A. Howe, New York City. Patented Sept. 15, 1863:

I claim a horse-shoe provided at its under or face side with a groove, having pendant projections or their equivalent within it to hold a filling of india-rubber or any other suitable material, substantially as herein set forth.

1,791.—Water Wheel.—James Leffel, Springfield, Ohio. Patented Jan. 14, 1862:

I claim, first, The above described wheel, constructed with two independent sets of buckets, a and b, the former having a central, and the latter a vertical discharge, substantially as described.

Second, I claim constructing and arranging the annular diaphragm, D, to operate in the manner and for the purpose herein set forth.

Third, In combination with the diaphragm, D, I claim the vertically discharging buckets, b, when constructed and arranged to operate as and for the purpose set forth.

Fourth, In combination with an upper plate, B, whose inner surface shall be slightly concave in that portion directly over the buckets, I claim making the surface upon which the lower edge of said buckets rest, curved as shown and described.

1,992.—Case for Water Wheels.—James Leffel, Springfield, Ohio. Patented Jan. 14, 1862:

I claim, first, The crown plate, A, provided with the horizontally projecting rim, c, and hub, A', as and for the purpose set forth.

Second, The cylindrical tube, R, provided with the horizontally projecting flange, e, when used in combination with plate, A, as herein described.

Third, I claim the gate, H, when constructed and operating as and for the purpose substantially as herein specified.

Fourth, In combination with the parts, A and R, I claim the use of a series of gates, H, as and for the purpose set forth.

Fifth, In combination with the cylindrical casing of a turbine wheel, I claim a series of scroll shaped gates so hung that they shall be nearly balanced by the pressure of the water.

Sixth, I claim the combination and arrangement of the collar, L, rods, P, lever, M, provided with the rock-bar, O, and pinion, N, when constructed to operate in the manner and for the purpose herein set forth.

1,993.—Cider Mill.—H. K. Parsons (assignee by mesne assignments of John Kranser), Harrisburgh, Pa. Patented Aug. 30, 1853:

I claim, first, So locating the hopper, as that the substance to be ground shall be delivered upon that portion of the piston or crusher which shall be within the hopper when thrust forward, or into the space formed by the withdrawal of the same, when thrown backward.

Second, I claim operating the pistons or concaves of a cider mill, by means of eccentrics, whether said pistons be arranged as in Figs. 1 and 2, to move in a straight line, or to be pivoted at top or bottom, as in Figs. 8 and 9.

Third, I claim the concave, k', arranged to operate in combination with the pistons, P, or with the concaves, d, as and for the purposes set forth.

EXTENSION.

Water Wheel.—Timothy Rose, Cortlandtville, N. Y. Patented Sept. 24, 1850:

I claim the discharge aperture of the chutes movable relatively to the axis of the wheel, or the axis of the wheel movable relatively to the aperture of the chute, substantially as described, for the purpose of varying the effective diameter of the wheel and thereby increasing or decreasing the velocity thereof, substantially as described.

PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents:

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small

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models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

Notes and Queries

W. V. H., of N. Y.—A fly-wheel does not create power—the idea is absurd. It is employed for two distinct offices. First, to give uniformity to the motion of machinery in cases where either the force or the resistance is variable. Second, to accumulate the power where a resistance greater than that of the force is to be overcome for a short period. An instance of the latter application is seen in the steam punch, where the resistance in some cases would stop the engine but for the aid of the heavy fly-wheel, in which the power of the engine for some time has been accumulated.

J. T. S., of N. Y.—High piston speed is a desirable element in an engine, but we cannot see how a much higher velocity can be got with a pair of double engines than with one engine of the pair. Some advantage may be derived from one helping the other off its centers, but if one engine runs 600 feet per minute, it does not follow by any means that two engines will run 1,200 feet. A high piston speed is economical, other things being equal. Any engine will run at high speed if you give it steam high enough and it is sufficiently large for the work. Mr. John Wiley, of Broadway New York, will furnish you with a book on ship-building.

P. S. S., of Pa.—We have no doubt that Mr. Hogg was in error in supposing that canned fruit will keep better without the addition of sugar. It is true that a small quantity of sugar in water will cause fermentation, but it is also true that a weak solution of sugar will ferment more readily than a concentrated one; indeed if it is sufficiently concentrated no fermentation will take place. All fruit contains sugar or starch enough to induce fermentation, and the addition of more sugar will doubtless tend to prevent fermentation.

F. E. W., of Mass.—You are mistaken in regard to the law. Unless you made a definite agreement with your workman to get up the improvement for you, you could lay no claim to it. He is employed by you to do a certain amount of work for certain wages, but has not pledged to you the result of his ingenuity in devising new inventions. This is as we understand the matter.

W. T. C., of Mass.—The mistake you made was in delaying your application for a patent, until some one has got a patent for the same thing. In order now to vindicate your rights, you must apply for a patent, and have your claims put into interference with those allowed to the other party. Many inventors by delaying their applications, involve themselves in much trouble.

B. & D., of N. H.—Steam causes the whistle to vibrate rapidly, that is what gives the sound. The steam strikes the thin edge percussively, or like a hammer, and that is what makes the vibrations. The pitch or note of all musical sounds is determined by the number of vibrations occurring in a given time.

J. H. C., of N. H.—If the watch falls with the same velocity of course the shock on the pivots of the balance wheel will be the same; but with a thicker case it would fall through the air with slightly greater velocity.

J. F., of N. Y.—Messrs. Balliere & Brothers, No. 440 Broadway, New York, have published a treatise on coal oil and petroleum by Abraham Gesner, M.D., F. G. S.

H. H., of Ohio.—Your improvement in sawing machines seems to be new, but before applying for a patent we advise you to have us make a preliminary examination into its novelty at the Patent Office.

R. B. W., of Ohio.—Mr. Richard Dudgeon, machinist, of Columbia street, this city, will furnish you with a punch that will cut an inch hole by hand in a bar one inch thick.

W. C., of Pa.—Your quadrant would measure the altitude of a star, but we should think with less trustworthy accuracy than those at present in use.

C. R. S., of Md.—The metal you send us is known as Chinese white copper. It is made by taking copper 40.4, nickel 31.6, zinc 25.4, iron 2.6 parts.

E. A. K., of N. Y.—The mechanical powers are the lever, the pulley, the wedge, the inclined plane, and the screw.

N. W. F., of N. Y.—There is no better electrical machine for medical purposes than Dr. Smith's, the kind you now have.

R. B., of Canada.—We know of no prize offered for a demonstration of the problem to bisect an angle.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Oct. 5, 1864, to Wednesday Oct 12, 1864:—

L. E., of N. Y., $25; R. C. & M., of N. Y., $35; B. & G., of Ill $20
F. H. P., of Conn., $15; E. T. M., of N. Y., $40; J. B., of N Y $20;
I. F. B., of Conn., $81; L. W. T., of N. Y., $22; H. S., of Tenn., $20; I. B., of N. Y., $20; J. B., of N. Y., $40; C. T. W, of Pa., $22; S. & S., of Mass., $15; W. Y., of N. Y., $25; G. G. P., of Pa., $40; A. M. of N. J., $15; A. J. N., of R. I., $25; J. S., of Conn., $25; W. N., of N. Y., $25; D. H. I., of Ill., $30; R. P. F., of Maine, $15; C. L., of N. Y., $40; J. S., of N. Y., $25; D. F. W., of Mass., $15; L. D. C., of Mich., $40; C. S., of N. Y., $12; H. B., of N. Y., $30; E. S., of N. Y., $20; J. S., of N. Y., $45; A. C. C., of N. Y., $40; O. G. B., of N. Y., $20; J. C., of N. Y., $20; A. M. G., of N. H., $20; S. C. R., of N. Y., $20; G. K., of Vt., $25; H. O., of Maine, $15; J. F. L., of Mich., $15; S. P., of N. J., $30; S. P. O., of Ill., $12; A. S. M., of Ill., $30; S. T., of Ill., $42; F. L., of Ohio, $15; D. I. S., of N. Y., $25; D. F. H., of Mass., $100; E. J. K., of N. Y., $10; L. G. K., of Mass., $20; V. W. B., of N. Y, $40; M. J. D., of N. Y., $40; J. L. T., of La., $15; H. N., of R. I., $20; H. N., of Pa., $20; P. & S., of Conn., $20; R. P. B., of Mich., $20; P. S. F., of N. Y., $20; R. & S., of Ill., $25; C. B., of Cal., $60; C. F., of N. Y., $30; J. S., of N. Y., $25; B. & L., of Cal., $15; J H. M., of Ohio, $25; N. B. B., of N. Y., $30; B. B., of R. I., $15; T N. D., of Ind., $15; J. F. S., of N. Y., $35; N. T., of N. H., $25; M. K., of Ohio, $25; A. J. S., of Cal., $19; T. M., of N. Y., $15; W. H. C. of Ind., $25; J. H. C., of Mass., $16; G. F., of Ill., $25; A. R. D., of N. H., $15; S. W. K., of Mass., $15; W. C. McB., of N. J., $35; S. R., of Pa., $30; G. S., of Mass., $15.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Oct. 5, 1864, to Wednesday, Oct. 12, 1864:—

C. L., of N. Y.; D. I. S., of N. Y.; D. S., of Cal. (4 cases); V. W. B., of N. Y.; L. W., T., of N. Y.; A. C. C., of N. Y.; R. & S., of Ill.; A. J. N., of R. I.; N. B. B., of N. Y.; S. P., of N. J.; W. H. C., of Ind.; G. K., of Vt.; H. L., of Iowa; G. F., of Ill.; G. M. M., of Pa.; L. E., of N. Y.; H. B., of N. Y.; J. S., of N. Y.; W. C. McB., of N. J.; W. Y., of N. Y.; J. H. M., of Ohio; W. N., of N. Y.; J. F. S., of N. Y.; J. S., of N. Y.; C. F., of N. Y.; S. R., of Pa.; A. J. S., of Cal.; R. C. & M., of N. Y.; J. S., of N. Y.; E. T. M., of N. Y.; C. S., of N. Y.; M. J. D., of N. Y.; J. B., of N. Y.; A. C. C., of N. Y.; C. T. W., of Pa.; J. S., of Conn.; C. A. B., of Cal.; D. H. I., of Ill.; S. P. O., of Ill.; N. T., of Ind.; A. S. M., of Ill.; G. G. P., of Pa.; M. K., of Ohio.

TO OUR READERS.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

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N. B.—Reliable orders filled for any part of the United States and Canada. 5 tf

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I WILL PURCHASE IN OPEN MARKET ALL THE Calvary Horses that may be presented and pass inspection at the Government Stables, corner of 10th avenue and 25th street, in this city, until further notice.
Payment will be made in checks payable in certificates of indebtedness, when seven (7) or more horses are received. Price, one hundred and sixty dollars each.
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N. B.—Send Postage stamp for Descriptive Circular of the Diamond Dresser. 11 10*

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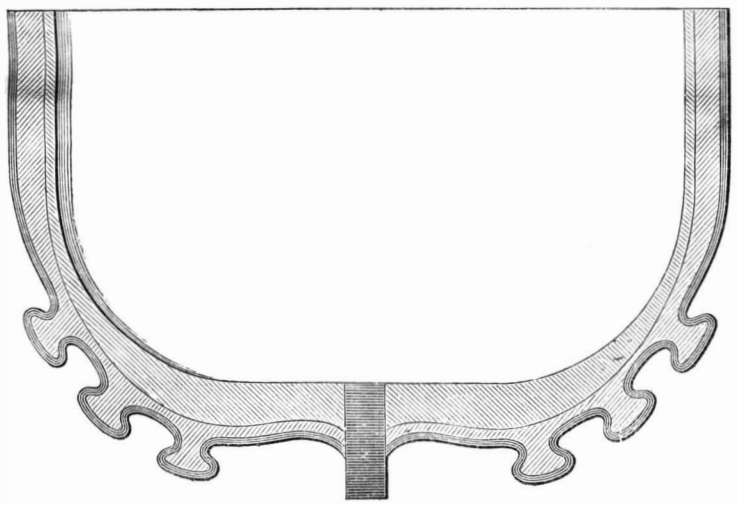
Improved "Rorqual Fold" for Ships.

Many narrow-beam ships are much benefitted by attaching long "shelves," running fore and aft, projecting downward, at an angle from the sides, a foot or more. These "shelves" take hold of the water, confine it, and thus prevent the heavy roll and lurch that crank ships are liable to. This invention is designed to effect the same object, and it is called by the inventor the "rorqual fold," from the whale of that species, which is the largest known to naturalits, and for the peculiar faculty of creating similar folds in its skin.

Regarding the uses to which it may be applied, and the advantages resulting from it, the inventor says:—

"Our vessels, as now constructed, sit on the water



BOWDLEAR'S "RORQUAL FOLD" FOR SHIPS.

regardless of the laws of hydraulics, and entirely at the mercy of the waves. There is no affinity between the vessel and its element. It rises and falls, rolls and pitches, without the least control over the waters around. My theory is, when my attachment is placed on a vessel's bottom that the tendency to roll is counteracted by the resistance these folds offer. They clench the water like so many fingers, and keep the vessel from rising above its true center of gravity, as the water and vessel retain their mutual hold of each other. Thus when a vessel is lifted by the powerful action of the sea, the momentum given exceeds that of the wave itself, and consequently she plunges at random, or rolls by her momentum beyond the requirement of the element by which she is surrounded; in fact she does not roll on a safe center of gravity.

"Practical men who have examined it, among them Admiral Stringham, are desirous to see it at once applied."

This invention was patented Oct. 14th, 1863, by John Bowdlear, of Roxbury, Mass. For further information address him at that place, Box No. 419.

Butter at Sixteen Cents.

Canada must be a very desirable place to live in at the present time. The prices of provisions in the London (C. W.) markets make us long for a corresponding reduction in the enormous prices for food which are obtained here. We quote from the Canada *Farmer:—*

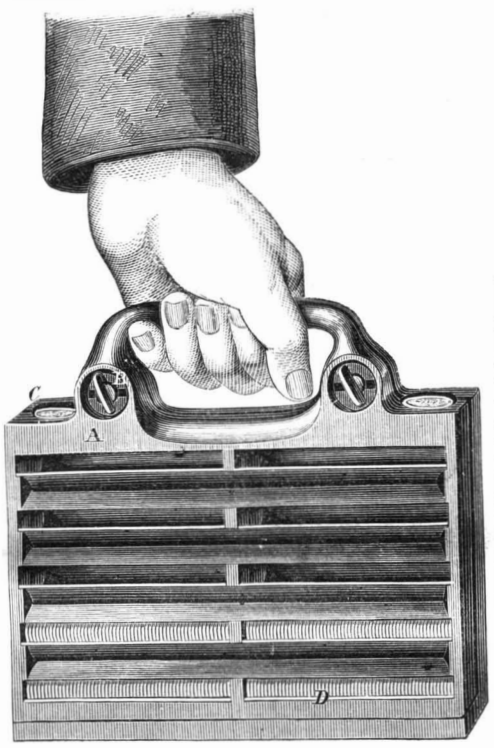
"Meat, from farmers' wagons, in large supply, and by the quarter very cheap. Beef $2 to $3 50 per 100 lbs. Mutton and lamb, 2c. to 4c. per lb. Poultry—dressed turkeys, 50c. to 75c.; geese, 25c. to 37½c. each; fowls, 37½c. to 50c.; ducks, 32c. to 40c. per pair. Butter, fresh in rolls, 16c. to 18c. Eggs, 10c. to 12½c. per dozen. Fruit—apples plentiful, at 25c. to 62½c. per bushel. Vegetables abundant; potatoes, 40c. to 50c. per bushel; turnips, 37½c.; onions, $1 to $1 25."

Beef here costs ten times as much. Butter three times and poultry six times as much. Potatoes nine times as much.

An English photographer has lately introduced a novelty in the mode of taking carte-de-visite photographs with the signatures of the sitters appended. This gives but little extra trouble. The sitter simply signs his name on a slip of paper, and finds its fac simile, diminished in size, transferred to the portraits when they come home.

HOWARD'S COIN SAFE.

By transporting specie to a distance in the ordinary canvass bags, boxes, or other packages, where the coins have a chance to rub against each other, a very perceptible loss occurs from abrasion or friction. The rough milled edges scraping against each other, and on the smooth parts, is the cause of this loss; the amount of wear on large lots of gold is really very serious, as our large importers know to their sorrow. This has been provided against, as will be seen by inspecting the accompanying engraving. The case, A, is made of cast-iron, and is japanned handsomely outside and in. The case separates in the middle like a portmanteau, and at the junction of the handle with the body has two small turn screws, B, which keep the case together when set as shown, but there are two slots in the handle which allow the case to be opened when the screws are turned horizontally. In the upper side of the case there are circular depressions, C, which receive the wax on which the seal of the owner or express company is placed. The gold sets in a series of racks inside, and each rack is proportioned to suit a certain denomination; or they may be made all of one



size as desired. The gold packed is shown at D and in this condition is wholly protected from loss by the causes mentioned previously. Money cannot be lost out of this safe as it is from bags, which are often cut or ripped, and it need not be counted, as the contents are known, when the racks are full, by a glance. It is more durable than a bag, for it will last for years, whereas bags are costly and soon wear out. The inventor cites one instance where this safe would have been useful; there are, doubtless, many similar ones:—"Last winter when there was about six inches of snow on the ground and it was fast increasing, a gentleman was carrying a bag of gold through Wall street; the bag ripped and a number of pieces fell in the snow, his predicament was peculiar; he could not leave what he had dropped for obvious reasons, he could not count what he had left so as to ascertain how much he had lost, he could not tell how many pieces there were under the snow. So all he could do was to rummage with benumbed fingers in all the snow on that part of the sidewalk, and with an amused audience to witness the performance." This coin safe can be conveniently carried in the hand like a carpet bag, and will, no doubt, become popular with our business firms.

A patent is now pending through the Scientific American Patent Agency by Joseph P. Howard, of Brooklyn, N. Y. For further particulars address Andrews & Co., 29 Cliff street, New York City

Soft soap mixed with a solution of potash or caustic soda, or pearlash and slaked lime, mixed with sufficient water to form a paste, is an excellent solvent for old putty and paint. Either of these laid on with an old brush or rag, and left for some hours, will render the putty or paint easily removable.

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